

6
Revere

COPPER

Roofing
& Flashings

REVERE

PROVIDES

dependable copper and copper alloy products for building construction and maintenance, and . . .

OFFERS

competent technical assistance in the selection and application of these materials to all building requirements.

FOUNDED BY
PAUL REVERE



REVERE BUILDING PRODUCTS

Sheet Copper and Leadtex (lead-coated copper) . . .

for roofing, gutters, conductor pipes, flashings, skylights, spandrels, decorative applications and termite proofing, also for range boilers.

Cheney and Revere Thru-Wall Flashing . . .

for protecting buildings against seepage, leaks and efflorescence.

Copper Water Tube, Brass Pipe, Red-Brass Pipe and Copper Pipe (S.P.S.) . . .

for water supply, hot and cold water lines, heating lines, drainage lines, oil burner, air conditioning and refrigerant lines, lawn irrigation and industrial piping.

Herculoy

for range boilers and hot water storage tanks, chemical containers and unfired pressure vessels.

Extruded Shapes of Architectural Bronze, Aluminum and Nickel-Silver, also Panel Sheets . . .

for the construction of doors, windows, grilles, store fronts, screens, pilasters and the like; Panel sheets of architectural bronze and other alloys for use with extruded shapes in the construction of the above.

Round, Square and Special Shaped Tubes in various alloys . . .

for door stiles and grilles in color match with Architectural Bronze Extruded Shapes and Panel Sheets.

Revere products can be safely written into any specification with assurance of quality and prompt delivery from Revere's Mills or through Revere's Distributors. Further information on any Revere Products supplied on request to any of the offices listed on rear cover.

COPPER ROOFING

COPPER IN BUILDINGS

The value of copper in construction of durable and beautiful buildings has been recognized by building authorities for many centuries. More than 600 years ago the Hildesheim Cathedral, roofed with copper, was erected in Germany, and stands today a monument to the enduring qualities of copper. In this country the copper roof of Christ Church, Philadelphia, Pa., constructed in 1737, is entering its third century of service, still in good condition. In 1801, Paul Revere, famous revolutionary patriot, established America's first copper rolling mill at Canton, Massachusetts. This enterprise, operated under the name of Revere & Son, was the lineal ancestor of Revere Copper and Brass Incorporated, which is America's largest producer of sheet copper. Revere's facilities, as modern as science can devise, include the first continuous copper rolling mill in this country. Early Revere copper was used to roof the dome of the Old Massachusetts State House in Boston, to resheath the American frigate, "Old Ironsides," and for the roof of New York's City Hall. Since then, buildings of all types from cottages to skyscrapers have been protected by Revere Copper.

REVERE SERVICE TO ARCHITECTS

Revere Copper and Brass Incorporated is prepared to cooperate with architects in selection and application of sheet copper for roofing, flashing, gutters, etc. Architects wishing to take advantage of the durability of sheet copper can obtain technical advice on practical problems of application, selection of weights; and means of ensuring the realization of plans through proper specifications. Others, appreciating artistic possibilities of copper for ornamental construction, are offered help with their designing problems. Inquiries may be addressed to Sales Offices listed on the rear cover.

PRODUCTS AND DISTRIBUTION

Products for the roofing industry available through Revere and Revere distributors include: Sheet Copper in all useable types, such as plain copper in soft and hard tempers, Leadtex (lead-coated copper), nickel and chromium plated copper, tinned copper, trimped copper, etc.; Parallel Edge strip copper for the manufacture of gutters, leaders, etc.; Cheney Flashing, Cheney system of Spandrel Water Proofing, Revere Thru-Wall Flashing.

Revere operates modern mills in Rome, N. Y.; Baltimore, Md.; Detroit, Mich.; New Bedford, Mass.; Taunton, Mass. and Chicago, Ill.

Shipment from these widely separated points to Revere's distributors, and continuous maintenance of large stocks of sheet copper in all commercial forms by these distributors in important trading centers throughout the country assure prompt and adequate service to architects, contractors and fabricators.

ADVANTAGES OF SHEET COPPER ROOFS

DURABILITY Copper is one of the least chemically active of ordinarily used commercial metals. This gives it high resistance to corrosion from air, water, and acid solutions. It is rust-proof, and therein lies the key to the lasting qualities of a copper roof. If properly applied it affords insurance against costly repairs to building interiors as well as maintenance expense on the roof itself.

The need for durability is especially important in flashings, gutters, and downspouts. Flashings are intended to insure against leakage at critical localities. Gutters and downspouts undergo severe service, and copper stands the strain better than rustable metal. Moreover, copper is fireproof. As its electrical conductivity is high, a copper roof, properly grounded, provides the best possible protection against lightning.

ECONOMICAL The first cost of copper is its only cost, if properly applied. Initially, it will be slightly more expensive than rustable metal, but such slight excess will be trifling when compared with the total cost of the building. The long-run economy to be obtained by the use of copper for roofing, flashings, gutters, downspouts and other sheet metal uses accrues through freedom from charges for maintenance or replacement frequently accompanied by the necessity for costly scaffolding.

ATTRACTIVE Nature acts as the decorator of copper. In time she forms an attractive green coating known as "patina" which enhances the beauty of the structure and acts as a shield against deterioration. Lead-coated copper may be used for grey tones, if preferred to the green patina mentioned above.

The roof is more than a mere cover for the building. It gives dignity, character and beauty; and the design and color are important to harmony.

EASY TO APPLY Copper is one of the most ductile of metals. This permits of easy working, and helps make it an ideal metal for roofing sheets. Through this inherent quality it can be moulded without difficulty to the contour of domes or cornices, as well as bent to form locks or valleys.

LIGHT IN WEIGHT Copper's corrosion resistance makes it possible to use a thin sheet so it becomes one of the lightest of roofs, thus eliminating heavy supporting structures. The weight of 100 square feet of 16 ounce copper roofing is from 120 to 140 pounds compared with 1000-2000 pounds for Clay Shingle Tile, 500-1600 pounds for Slate, 530-715 pounds for Felt and Gravel, and 200-300 pounds for Wood Shingles.



THE ALL-COPPER ROOF

The ideal roof is all copper. Such a roof, properly installed, will last as long or longer than the building on which it is used. It assures minimum servicing and upkeep expense, is permanently water-tight and weather-tight, and efficiently protects the insulation beneath. It possesses intrinsic beauty that is enhanced with age, when it takes on a natural protective bluish-green patina that is greatly admired. The initial cost of an all-copper roof is slightly more than for most other types, but this additional cost is warranted when these qualities are taken into account.

However, where the preference of the home owner or style of architecture dictates roofs of other materials—such as slate, shingles, or composition shingles, clay or cement tile—Revere Sheet Copper also plays an important part.

Flashings, valleys, ridges, cornices, gutters, eaves troughs and conductor pipes should be constructed of Revere Sheet Copper to insure maximum protection against weather.

ROOF DESIGNS

Roofs may be flat, pitched, or made up of a combination of slopes. Principal types are: (1) The ridge or gable roof. (2) The hip roof. (3) The gambrel roof. (4) The mansard roof. (5) The flat roof.

Copper can be used for all of these types of roofs. Its application follows five standard methods. These are: (1) Standing Seam. (2) Batten or Ribbed Seam. (3) Flat Seam. (4) Corrugated Copper Roofing. (5) Copper Shingles and Tiles. The first three of these will be discussed in detail in the following pages. The slope or slopes of a roof, with climatic and drainage considerations, will largely determine which method should be employed. In general, the flat seam method is used for flat roofs and decks, and for domes and cupolas; the standing and batten seam methods, for sloping roofs.

STANDING SEAM ROOFING

In standing seam roofing the sheets are joined along their long sides with seams left standing about an inch. These seams break up the roof area, avoiding the monotony of a continuous large expanse and give an attractive ribbed appearance, al-

though less marked than in the batten type. In general, standing seam roofing is applicable to the same type of structures as the batten type, and can be used on smaller buildings more artistically. See details page 5.

FLAT SEAM ROOFING

Flat seam roofing is used most commonly on flat decks or flat roof areas, but is adaptable to all slopes. It can be used on slopes of $\frac{1}{4}$ " per foot and greater. Many very steep roofs, conical spires, towers, domes, and other curved surfaces are covered with flat seam roofing. It is necessary only that the roof and gutter have sufficient slope to shed the water. On curved surfaces the copper sheets are patterned in various shapes and sizes, and in all flat seam work large sheets should be avoided.

Small sheets, with $\frac{1}{2}$ " seams, flat-locked and soldered, are

used for flat roofs and decks. The size recommended is 14" x 20". These sheets with edges already tinned for soldering are stocked by some distributors and are available on order from Revere Mills through all Revere distributors. If there is no possibility of water collecting on the roof, because of clogged outlets, or ice and snow, the seams can be left unsoldered and filled with white lead. This construction is seldom used except on domes and steeples and when used the sheets need not be tinned. For details see page 8.

BATTEN OR RIBBED SEAM ROOFING

In this type of roofing the surface is broken up by evenly spaced battens or ribs laid parallel and running with the slope of the roof. The roof covering is made of soft (roofing temper) copper sheets formed between battens, and caps over the battens locking into the sheets. This construction safely provides for lateral expansion and contraction, if due consideration is given at time of laying to local temperature ranges.

The artistic effect of these ribs makes the batten seam excellent for large roof areas of public buildings, churches, cathe-

drals and large residences as it provides dignity and ornamentation. This type can be used on slopes of 3" to the foot or more. It always should be borne in mind that the longitudinal seams at the battens are unsoldered and, therefore, not water-tight. It is not always safe accordingly to use the batten method on slopes as low as 3" to the foot in localities where quantities of ice and snow may collect and at melting cause water to back up over the battens. Such special local conditions must be considered when roofs are designed. For details see page 11.

STANDING SEAM COPPER ROOF

Standing seam construction is strongly recommended as the best way to apply copper as a roofing material wherever conditions permit. The sheets are joined along their long sides, with seams left standing. This construction gives an attractive appearance and, being unsoldered, allows for expansion and contraction. Most of the centuries-old roofs throughout the world are of this type, in which use of solder is at a minimum.

These seams break up the roof area, avoiding the monotony of a continuous large expanse and give an attractive ribbed appearance, although less marked than in the batten type.

Standing seam roofing is suitable for buildings of all types having a roof slope of $2\frac{1}{2}''$ or more per foot. It lends itself to more artistic use on small buildings than does batten seam roofing.

Standing seams are usually made to finish $1''$ high. Economical spacing of seams calls for copper sheets in stock widths—multiples of $2''$. A good rule to follow for general requirements is to use $20''$ sheets.

Standing seams should never be riveted or soldered, as this will prevent movement of the sheets. Cross seams should not be soldered if pitch of roof is sufficient.

FORMING THE STANDING SEAM

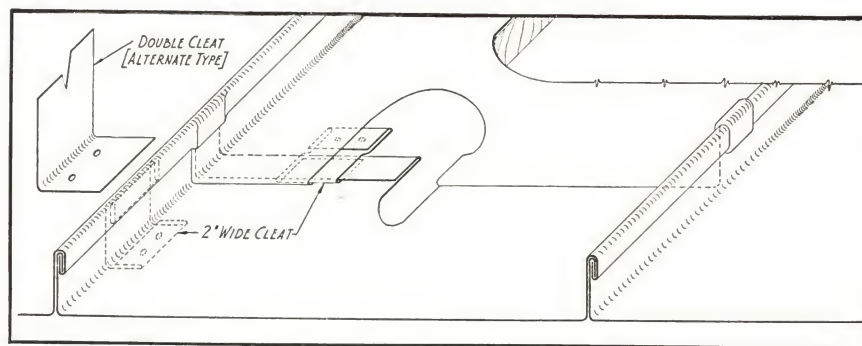
SIZE AND SPACING OF SEAMS Standing seams usually are made to finish $1''$ high. The spacing of the seams should be made which will call for copper sheets in stock widths.

SIZE OF COPPER SHEETS For standing seams to finish $1''$ high, the sheets will figure $2\frac{3}{4}''$ wider than the seam spacing. Accordingly, a sheet $20''$ wide would give a seam spacing of $17\frac{1}{4}''$.

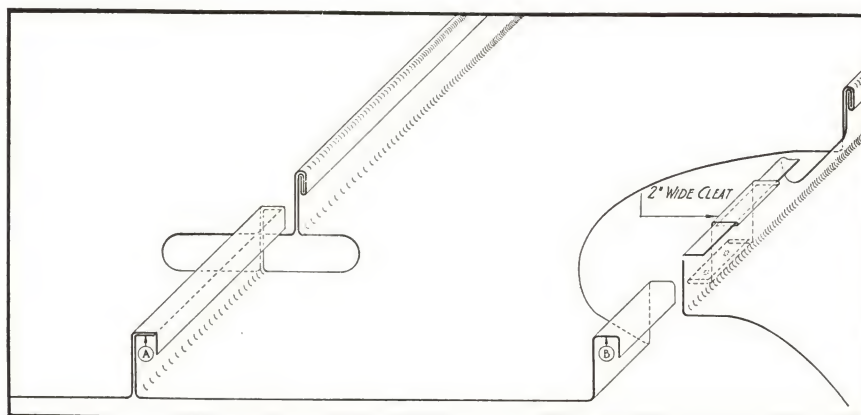
To make a $1''$ standing seam, vertical bends are made on the lengthwise edges of the sheets—on one side $1\frac{1}{2}''$ and on the other $1\frac{1}{4}''$, the $1\frac{1}{2}''$ vertical bend on one sheet always adjoining the $1\frac{1}{4}''$ bend on the adjacent sheet.

METHOD OF LAYING Cleats $2''$ by $2\frac{1}{2}''$, bent as shown, are nailed to the sheathing $8''$ to $12''$ apart against the $1\frac{1}{4}''$ bend of the sheets. The cleats are held with two copper nails and the ends are bent over to cover the nail heads. The last $\frac{1}{4}''$ of the cleats is bent over to hold the sheets. The side of the next sheet having the $1\frac{1}{2}''$ bend then is put in place over and against the cleats, and the extra $\frac{1}{4}''$ bent over, as shown. Finally, the top $\frac{1}{4}''$ of the whole seam is folded over again through 180° to form a double-lock.

Typical
Bay Standing
Seam Method



Typical
Bay-Preformed
Pan Method



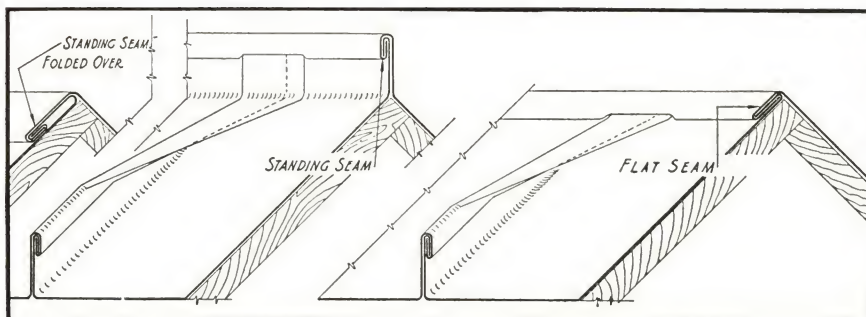
FORMING RIDGES OR HIP

The drawing presents various ways of finishing the ridge or hip of a standing seam roof. Pans from the two sides can be brought up beyond the ridge, $\frac{1}{4}$ " higher on one side than on the other, and a standing seam formed along ridge. If desired, this seam can be folded down flat as shown on left. The standing seams of roof slopes are turned down as they approach the ridge and folded into ridge seam. Ridge and hip standing seams generally are finished same height as those on the roof

slopes.

In place of a standing seam, flat-lock seams can be used on a hip or ridge as shown on right of drawing. Here roofing seams are turned down flat in the same direction as seams are formed and folded in with the ridge seam. On one side flattened standing seams run into the ridge seam, and from the other they are carried over the ridge and down into ridge seam.

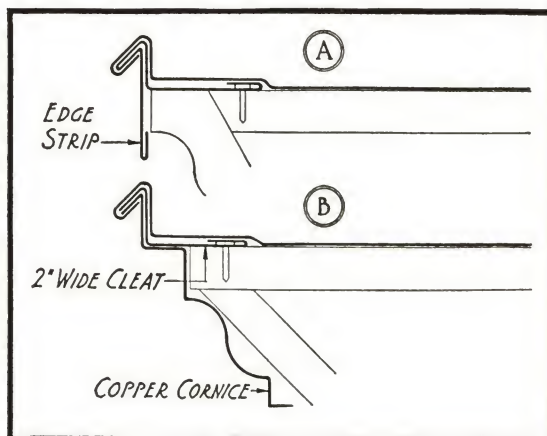
Ridge or
Hip Details



FORMING GABLE ENDS

The drawing shows two methods of finishing standing seam roofing at gable of a roof. Detail A provides a drip edge to prevent wash running down face of building in case of overflow at built-up edge; and Detail B assumes a cornice at the end of building. Cornices of considerable height should be made of crimped copper, or built in sections locked together to permit expansion. The 2" copper cleats should be spaced 8" to 10" apart.

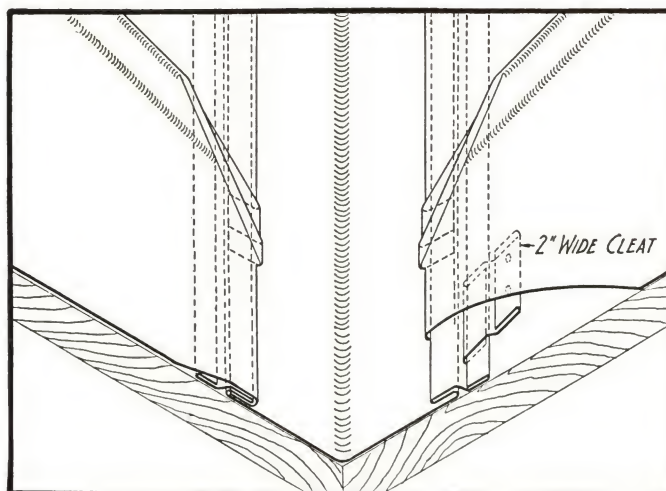
Gable End
Details



FORMING VALLEYS

The drawing shows standing seam roofing at a valley. Standing seams are turned down in direction opposite to which they are folded, and together with pans hooked into the valley flashing. Valley flashing is cleated as usual with 2" cleats 12" on centers with ends folded over the nail heads.

Valley
Details

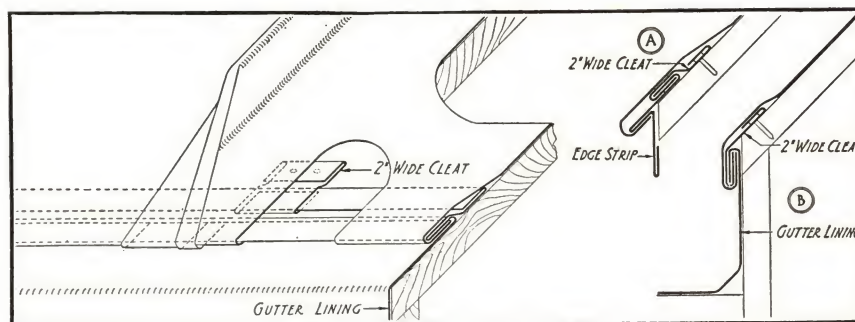


FORMING EAVES OR GUTTERS

The drawing shows various methods of finishing standing seam roofing at eaves and gutters. The standing seams are folded over (with seam opening at top) as they approach the eaves so they can be folded into the joint with the gutter or over an edge strip. The gutter lock can be placed on roof slope, as shown at the left, or at top of the inner side of gutter, as in Detail B. Gutter should be designed so its outer edge

is at least 2" lower than this seam which is left unsoldered to allow movement in the gutter lining. If there is no gutter a drip edge should be provided as suggested in Detail A. The loose-lock seam where roof and gutter meet may be filled with white lead to prevent water entering from capillary attraction. Do not solder.

Eaves or
Gutter
Details



PARAPET OR WALL FINISHES

The drawing shows method of finishing standing seam roofing at a wall at top of the roof, using a cap and base flashing. The roofing is carried up close to the wall, with room allowed for cleating as shown. The base flashing is locked into the seam over the cleats and the standing seams are folded down, with the open side underneath and carried into the flat-lock seam which is tack soldered. Another way of securing the base flashing is to use a longer cleat than shown in the drawing, so that the end of the cleat can be brought entirely through the locked seam and turned up on the outside of the base flashing. The base flashing should be carried up the wall at least 6" and lapped 4" by cap flashing.

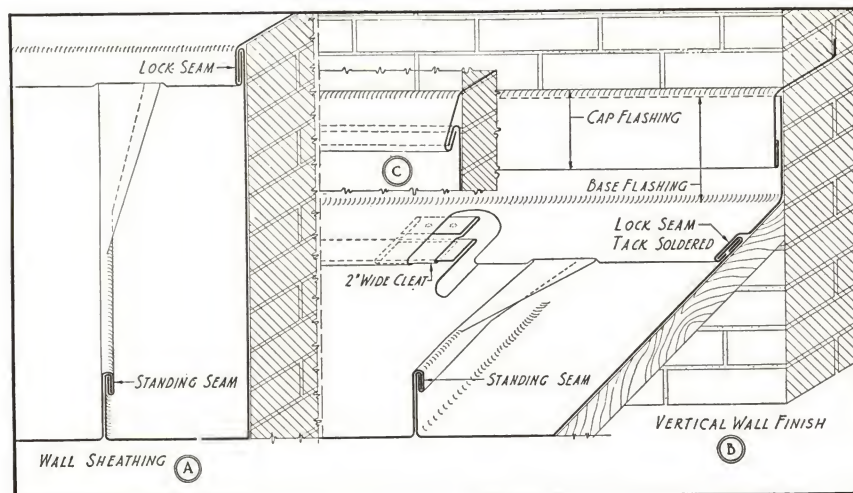
The cap flashing is continuous, with side laps 3" between sections, and the bottom edge is folded back 1 1/2" for stiffness. The cap extends at least 2" into the masonry. If installed as the

wall is erected, it should be anchored back of first brick. If placed after the wall is erected, it is fastened with lead plugs.

Detail A shows method of finishing standing seam sheathing of a vertical wall. The standing seams are carried to top of wall where they turn down and finish into the lock seam with wall capping. Such vertical sheathing can be used in place of the cap flashing at the right, when necessary to waterproof the entire wall above the sloping roof.

Detail C shows an alternate of the construction of B. The base flashing is locked into the cap flashing with a deep lock (at least 2") as shown. This may be left standing out, as in the illustration, or flattened back against the wall. In either event the top of the lock should be from 2 1/2" to 3" below the point where the cap flashing enters the wall, so that the base flashing can be locked into it in place.

Details of
Parapet or
Wall Finishes



For Specifications See Page 27
For Technical Data See Page 18

For Special Flashing See Page 14
For Thru-Wall Flashing (Cheney and Revere) See Page 33



FLAT SEAM COPPER ROOF

Flat seam roofing is adaptable to all slopes but is used commonly on flat decks or flat roof areas. It can be used on slopes of $\frac{1}{4}$ " or more per foot, since it is necessary only that the roof and gutters have sufficient slope to shed water, but also many very steep roofs, conical spires, towers, domes and other curved surfaces are covered with flat seam roofing.

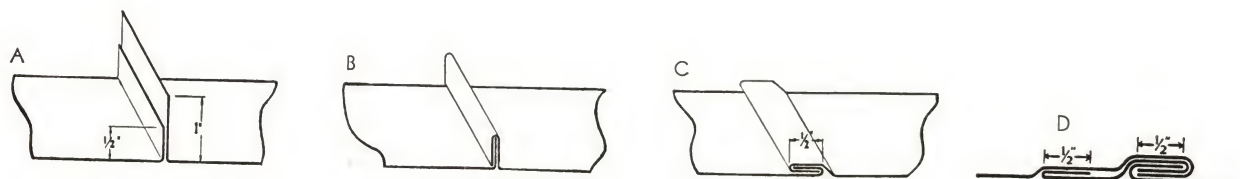
On curved surfaces the copper sheets are patterned in various shapes and sizes according to contours to be covered, and in all flat seam work large sheets should be avoided. For flat roofs and decks 14" x 20" sheets with $\frac{1}{2}$ " seams, flat-locked and soldered are recommended. These sheets are available on order with edges tinned for soldering. If circumstances are such that there is no possibility of water collecting on the roof, the seams can be left unsoldered and should be filled with white lead.

The requirement of soldered seams renders movement resulting from temperature changes of special significance in flat seam work. Consequently, runs longer than 30 to 40 feet of flat seam soldered sheets should not be permitted unless the extremities are free. Large areas should be broken up with expansion joints, such as battens, as shown on drawing page 9.

FORMING THE FLAT SEAM

The seam is developed as shown below, as follows: (1) Tin the edges of the sheets, (2) Bend the edges at right angles, (3) Set the sheet with the short bend in place, (4) Set the second sheet in position A and, (5) Turn the edge of the second sheet 180° down over the edge of the first sheet, B. Finally, (6) Turn all together 90° in the same direction down

on the first sheet, flatten and solder C. When the seam is to be cleated down, an additional step is required between (3) and (4) above, namely, (3a). Place the cleat against the sheet and nail the cleat to the roof, turning the end back over the nails. The cleat then is folded in with the sheets. D shows a single flat-lock seam with cleat.



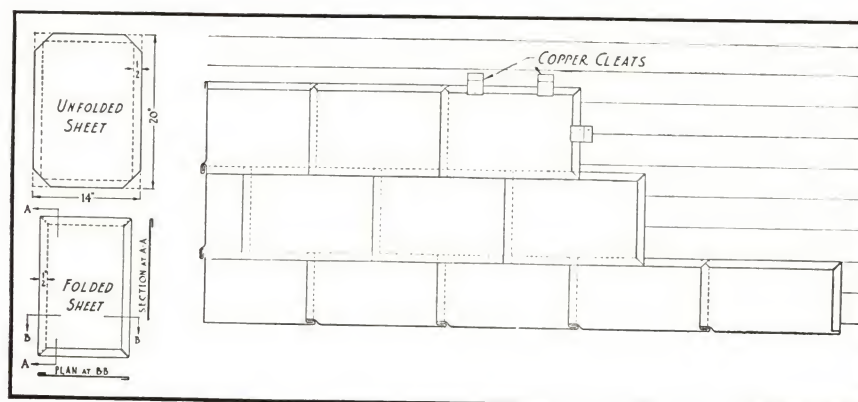
The drawing illustrates the method of laying a typical flat seam area. The sheets are tinned on all edges, for soldering, and then are formed to lock $\frac{1}{2}$ " with adjacent sheets. The corners must be properly clipped to permit folding, as shown at left. Opposite sides of the sheets are folded in opposite directions so they can hook into the next sheets properly.

The sheets are held to the surface by 2" copper cleats. Usually two cleats hold one long side and one cleat a short side of each sheet. The

other two sides are held by the edges of adjacent sheets already cleated. The cleats should be nailed close to the sheet and the ends folded back over the nail heads. Sheets with too few or poorly nailed cleats will not remain properly soldered.

The cross seams are folded in the direction of flow and it is of great importance that they be well sweated with solder. All seams should be flattened with a mallet before soldering, and then the solder sweated in to fill the seam completely.

Flat Seam
Method



EXPANSION AND CONTRACTION

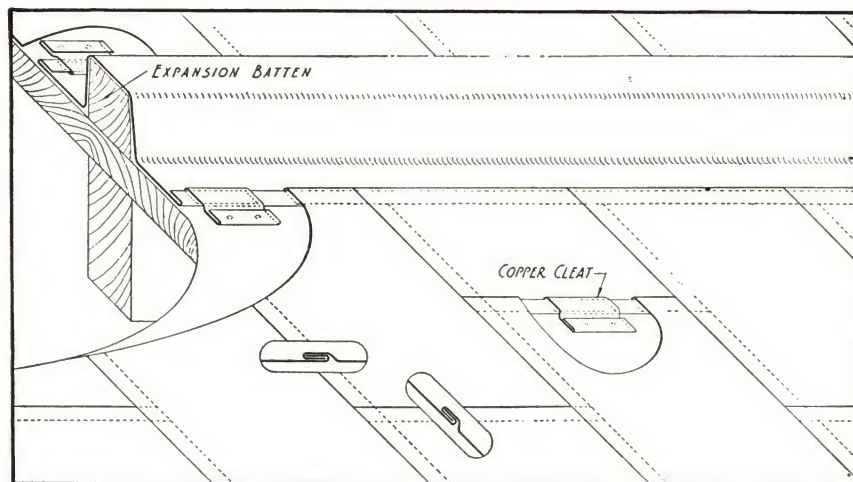
In the batten and standing seam methods, where longitudinal seams are unsoldered, lateral movement between seams can take place if proper allowance is made at the time of laying. Movement in the direction of the roof slope in such construction also is cared for in various ways, such as loose cross seams where the slopes permit, special forming of the pans, and the strip pan method.

The flat seam method, however, does not allow free movement. The theory of the construction is that each small sheet is a separate unit through being cleated, and that the cleats prevent movement being transmitted over the entire area. Under expansion, each sheet puffs up slightly at the center. Under contraction, the cleats tend to prevent a total area movement being localized, but this is counteracted by the fact that each sheet is soldered to an adjoining one, thereby creating a continuous expanse of copper which is subject to general

movement. Consequently, runs longer than 30' to 40' of flat seam soldered sheets should not be permitted unless the extremities are free. Large areas should be broken up with expansion joints, such as battens, as illustrated in the drawing. These run in the direction of the slope, and are covered with a copper cap, cleated down, to which adjoining roofing sheets are locked and soldered. The battens are shaped as in batten seam roofing, with bottom corners bevelled to permit the movement required.

If the run from ridge to eaves also has to be broken, steps or drops should be installed perpendicular to the slope. These should be sufficiently high to permit the roofing above and below to be joined with a vertical loose-lock seam on the face of the step. To prevent water entering, the seam is brought far enough above the lower roof area, or filled with white lead.

Method of Making
Expansion Batten

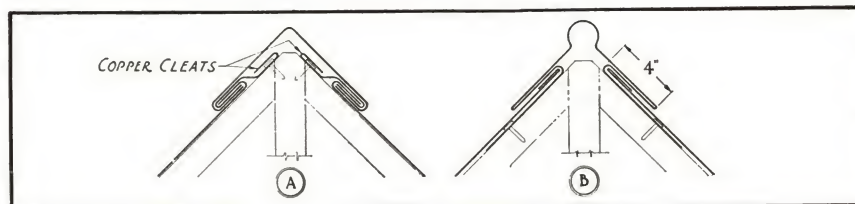


RIDGES OR HIPS

The drawing shows two varieties of ridge finishes for flat seam roofing. In Detail A a flat copper sheet is folded over the ridge and cleated to the sheathing. The roofing is locked into the edge folds, and either soldered or left loose as dictated by the slope. If movement is required, the lock should be large enough to give the necessary lap, or a ridge piece of the type shown in Detail B should be used. This has a large crimp

into which the top roofing sheets can slide. The edges of the sheets are folded back for stiffness. The lap is sufficient to give required safety. Other ridge finishes can be used. The details for ridges with standing seam roofing also are applicable with the flat seam method and are usual for the hips of flat seam roofing.

Ridge or
Hip Details

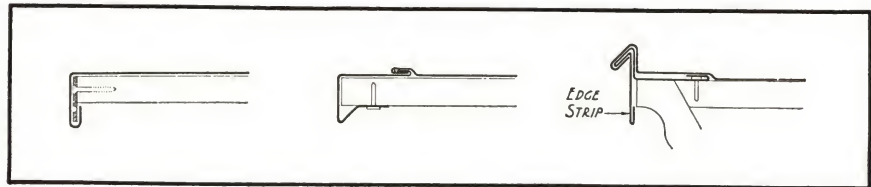


FORMING GABLE ENDS

Various constructions are shown for finishing flat seam roofing at gables all of which can be used with flat seam work. Those with the edge built up have the distinct advantage of

keeping the drainage on the roof at the ends of the building, and are recommended.

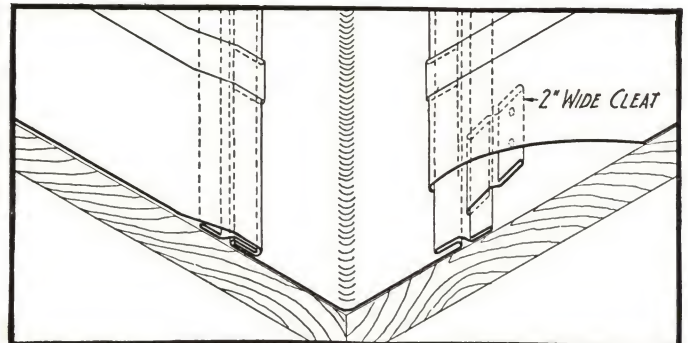
Gable End
Details



FORMING VALLEYS

Valleys seldom are encountered in flat seam work, and then are usually continuations over a depression of the flat seam construction. When a valley is to be formed of a continuous sheet in the usual way, the construction is similar to that for standing seam work. The small roofing sheets may lock directly into valley edge-folds over the cleats. In the latter case, the valley lock often is larger than the lock in the roofing sheets. Then if left unsoldered, water will not fill the lock and get under the roofing sheet.

Valley
Details



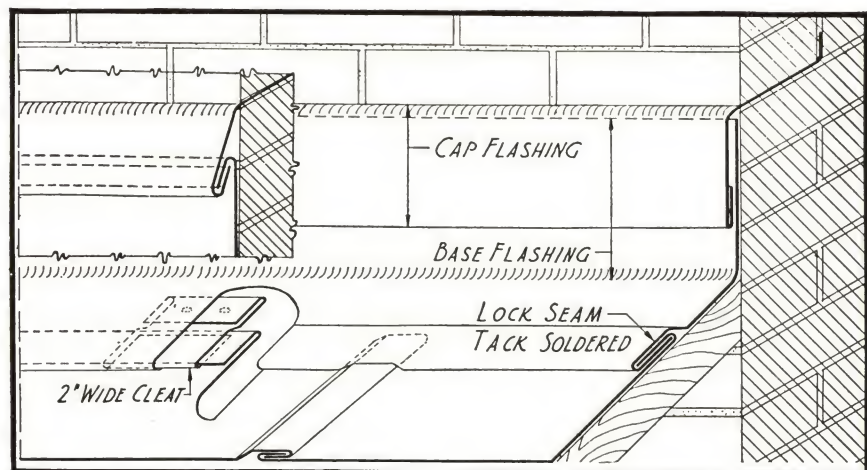
WALL FINISHES

The use of the cap and base flashing principle gives the best construction. The roofing sheets are turned up against the walls at least 6" and then lapped 4" by cap flashings set in the masonry. On the side walls the cap flashings should be stepped from course to course as required by the slope; in most cases, as the slope will be slight, there will be considerable length of cap flashing in each course. In exposed locations with long runs it often is desirable to prevent the wind from lifting the cap flashings by inserting brass brackets or straps about 1" wide and 1/8" thick at intervals in the masonry, these

extending down over the flashing. The cap flashings may be tacked with spots of solder at the side laps.

Insert the cap flashings in walls as the masonry progresses. Except where through flashings are required to waterproof the entire wall, the copper sheets are usually carried into the wall 4" and turned up 1/4" back of first brick. If flashings must be installed after the wall is erected, secure them with lead plugs about 1" wide spaced from 8" to 10" apart, filling out the joint with elastic cement.

Wall Finish
Details



FORMING OF GUTTERS

Details of various types of gutters will be found on pages further along in this catalog.

For Specifications See Page 27
For Technical Data See Page 18

For Special Flashings See Page 14
For Thru-Wall Flashings (Cheney and Revere) . . See Page 33

BATTEN SEAM COPPER ROOF

Copper roofs of this type are characterized by evenly spaced battens or ribs laid parallel and running with the slope of the roof. The battens are usually cypress, spruce or pine strips fastened to the laying surface. The copper sheets are laid between the battens with edges overlaying the latter and interlocked with a copper cap strip over battens; this interlocking construction providing adequately for expansion and contraction, if proper allowance is made for local temperature ranges.

Batten seam roofing is efficient for large roof areas, and is especially popular for public buildings, churches, cathedrals and other large buildings of ornamental and dignified character. Although batten seam construction is generally approved for roof slopes of 3" or more per foot, it may not be desirable to use it on slopes as low as 3" for service in localities where quantities of snow and ice may collect.

Most battens are of wood, but they may be of heavy copper or copper alloy. Battens are ordinarily spaced from 20" to 30" apart; exact spacing being adjusted, to fit width of copper sheets.

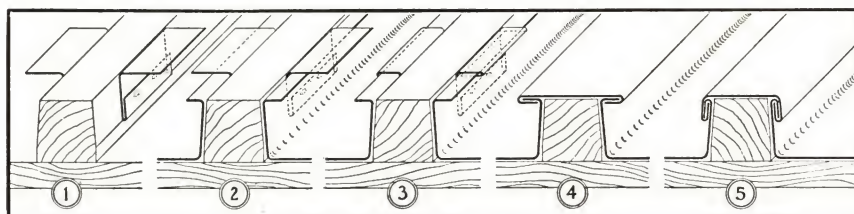
FORMING THE BATTEN SEAM

The drawing illustrates the steps in forming the batten seam. (1) Cleats 2" wide and 3" long are nailed to the sides of the battens. They should be of 16 ounce copper spaced from 8" to 12" apart, secured by two copper nails with ends of cleats turned over to cover nail heads. (2) Copper sheets of required width and properly formed are placed on roof between battens and against and under cleats. The long edges of the sheets have been turned up at right angles, and the final 1/2" turned at right angles again. (3) The sheets are secured by turning the free ends of the cleats down and back to engage the edges

of the sheets. (4) The rib is covered with a copper cap of proper width, the edges folding back on themselves to engage the edges of the sheets. (5) With the caps in place, the edges are dressed down against the batten, forming 1/2" lock seams.

The sheet may be treated in a number of ways at the cross seams and at the corners. Solder should be eliminated where possible, to care for expansion and contraction. The temperature at time of laying should be kept in mind so allowance can be made for expansion, contraction, or both. Two common methods of handling sheets are as follows:

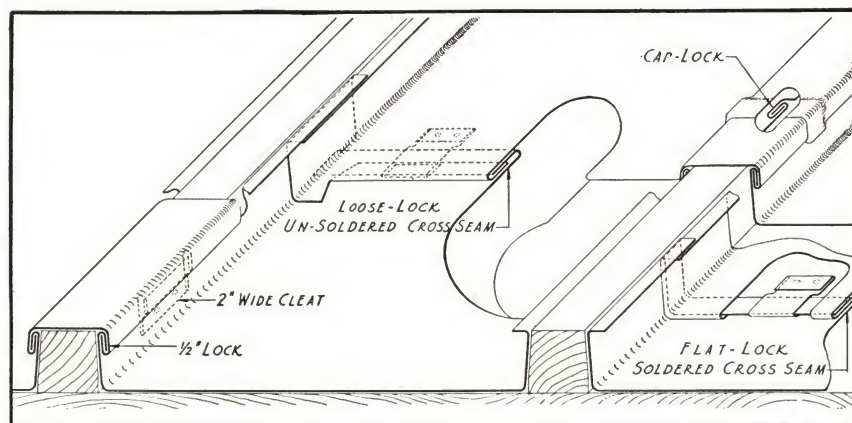
Development
of
Batten Seam



(1) ROLL METHOD: Full length sheets are flat-locked and soldered together to extend from ridge to eaves. Half-inch seams are used. Strips or rolls are formed on the job, as just described. This method is satisfactory only for short runs that connect directly to eaves.

(2) PAN METHOD: Sheets eight feet long (or shorter), formed to required shape in a brake at the shop. Individual sheets, after bending, are known as pans. This method allows cross seams to go unsoldered, if pitch is sufficient, and is recommended for most work.

Typical Bay
Batten Seam
Method



FORMING RIDGE OR HIP

Drawing shows method of constructing a batten seam ridge or hip. Here the dimensions of the ridge batten are controlled by the slope of the roof so the roof battens meet it with top flush. The roofing sheets are cut so they can be turned up in the corners against both battens and have $\frac{1}{2}$ " flanges left to receive cap sheets. An accurate pattern should be made to insure proper fitting of the sheets.

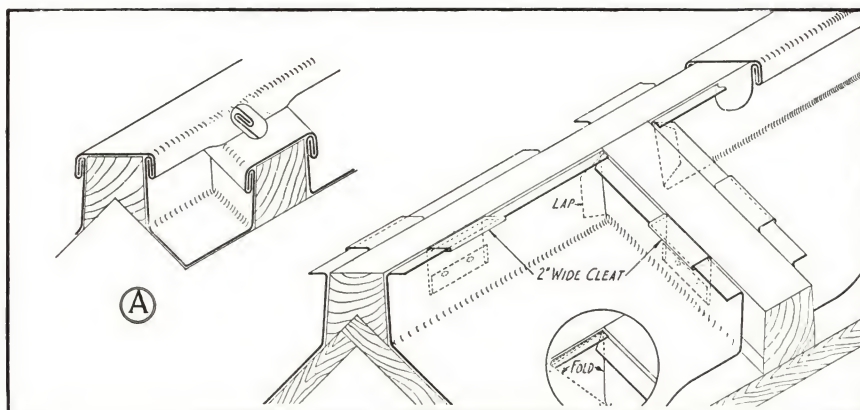
The tab marked "lap," which is part of the side of the pan, is folded back of the sheet and soldered watertight before the sheet is laid. An alternate method, which is preferred by many good roofers, is shown in the small circle. Instead of cutting a tab out at the corner, the excess metal is folded back of the turn-up of the pan, against the ridge batten. This method

eliminates the use of solder. After the pans have been cleated in place, the batten caps are slid on and locked.

As shown in Detail A, a tab on the top end of the batten cover is turned back, to lock into the ridge cap. The ridge cap is then fitted into place so as to lock into the top of the roof pan, and the top tab of the batten cap. Between battens this turns down against the ridge batten. At the side battens the flat lock lies on top of the batten cover as shown.

There remains the problems of providing for longitudinal movement of the side and ridge or hip batten covers. These should be formed from strips not over 8 ft. long, locked into adjacent sections.

Ridge
Details

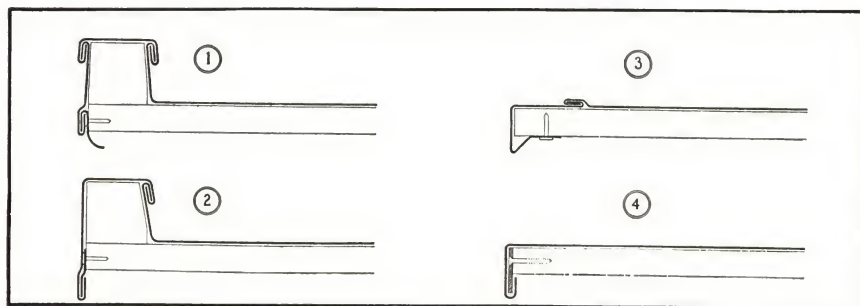


FORMING GABLE ENDS

Drawing shows four methods of finishing batten roofing at sides or gable ends. Details 1 and 2, have the advantage of keeping water from dripping over edge of roof. If a low finish is desired, a drip edge should be provided as suggested in Details 3 and 4. Nails or screws should be placed from 8" to 12" apart.

Detail 1 is applicable where roof finishes in a metal cornice, but with nailing as shown the cornice either must be narrow (less than 12") or built up of sheets loose-locked together to take care of expansion and contraction. In Detail 3, where roofing is nailed, a flat-lock seam caulked with white lead is inserted unless the last batten is within about 12" of edge.

Gable End
Details



FORMING VALLEYS

Drawings show method of finishing batten seam roofing at valley. Valley is constructed with continuous fold-over crimps into which roofing sheets can be locked as shown. A final fold is provided along both edges of valley for cleating. Sheets and caps are folded around the batten ends and secured with lock seams.

The method of laying out the sheets at batten ends is shown in Detail A. Pans are cut at ends so portions up the sides of battens have tabs projecting beyond the batten ends, and portions of the roof have the ends turned back into the

valley crimp. Auxiliary pieces to fit over batten ends are formed and slipped inside the ends of roofing sheets. These end pieces are cut the shape of the batten end but $\frac{1}{2}$ " larger all around, and corners are cut out so that the extra $\frac{1}{2}$ " can be folded toward the front at top and sides, and back into the valley crimp at the bottom.

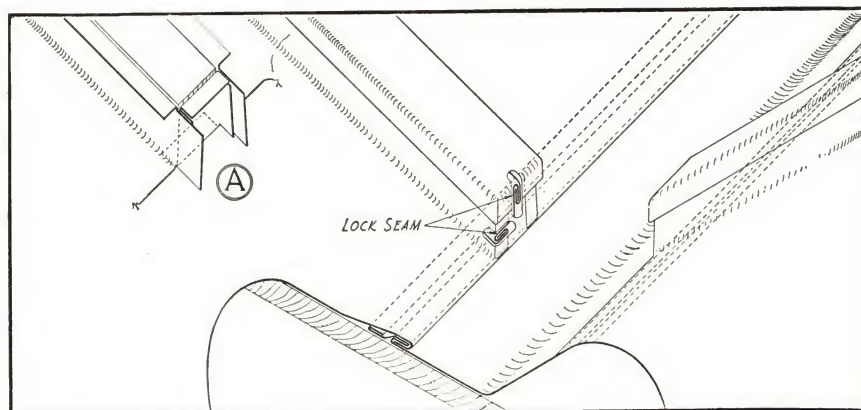
The 1" tabs on the sides of pans are folded back $\frac{1}{2}$ " to engage sides of the end cap, and these locks are folded flat against the batten end. Finally, batten cap is placed, and locked to pans as usual. The end of the batten cap has been

Batten seam copper roof—continued

cut so that for the width of batten top it projects 1" beyond end of the batten. Tab is folded under and back $\frac{1}{2}$ " to engage top

flange of end cap, and this lock is then folded down against batten end. Vertical seams of cap are soldered.

Valley
Details

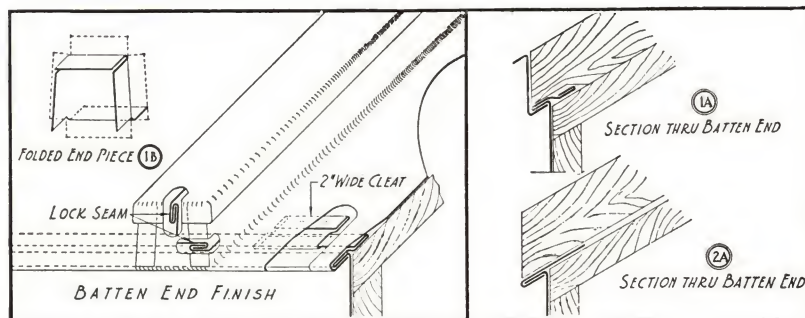


FORMING THE EAVES

In detail at the left the use of the end piece (Detail 1B) and the method of locking the pans and batten cap to it are identical to the valley finish shown in Valley detail. As brought out in Detail 1A, the batten projects slightly at the eaves, and the bottom is sliced off at the end to give room for the edge

fold of the gutter lining which is continuous along the roof for cleating. A crimp is put in the gutter lining under the end of the batten so the end piece may be locked over it. Detail 2A shows another method.

Eaves
Details

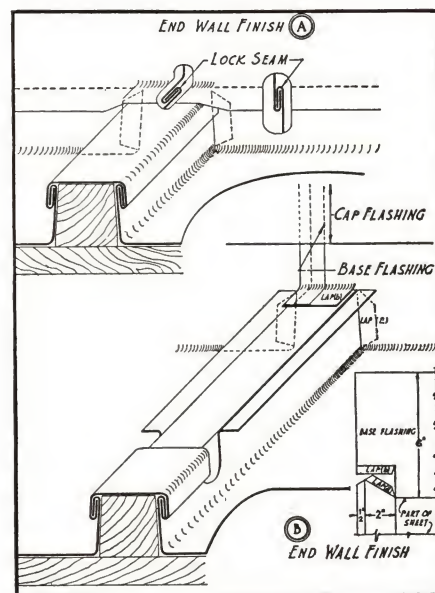


WALL FINISHES

When a batten roof slopes from a wall, one type of construction is shown in A. Pan sheets are cut at corners to turn up against the wall and battens. They extend up the wall the height of the battens with $\frac{1}{2}$ " of additional metal forming a lock with wall sheathing. Tabs (dotted) are folded against backs of the ends of the pans and soldered. When batten cap is placed it has an extra $\frac{1}{2}$ " at upper end, the width of batten top, which is folded down to form a hook. Finally, the wall sheathing, provided with a continuous $\frac{1}{2}$ " fold along the bottom edge, is locked into pans and batten caps, and seam is dressed down, flat on top of the battens, and vertically against the wall. This lock should not be soldered, but filled with white lead.

The method shown in B makes use of a cap and base flashing finish at wall. The pan is cut as shown at lower right, allowing it to be folded into the corner between wall and batten, and to extend up the wall 6" as a base flashing. Lap (a), which is part of pan on side of batten, is folded in back of base flashing and carefully soldered watertight. Lap (b) extends a short distance down over batten, and is joined to a similar sheet from the other side by either a lock or a lap seam. Lap (b) is raised slightly from batten to permit sliding batten cap under it. After batten cap has been locked to flanges of pans lap (b) is soldered to it around three sides, and vertical joints between the upper end of batten cap and base flashing also are carefully soldered.

Cap flashing should be inserted in the masonry. Side laps between sections of the cap flashing should be at least 3" and the cap flashing should lap base flashing at least 4". Side wall finish is the same as any regular parapet flashing.



For Specifications See Page 27
For Technical Data See Page 18

For Special Flashings See Page 14
For Thru-Wall Flashings (Cheney and Revere) . . See Page 33



SPECIAL FLASHINGS

In roofs and walls of a building there are many places where joints must be watertight. Sheet-metal protection—flashing—is best for this purpose.

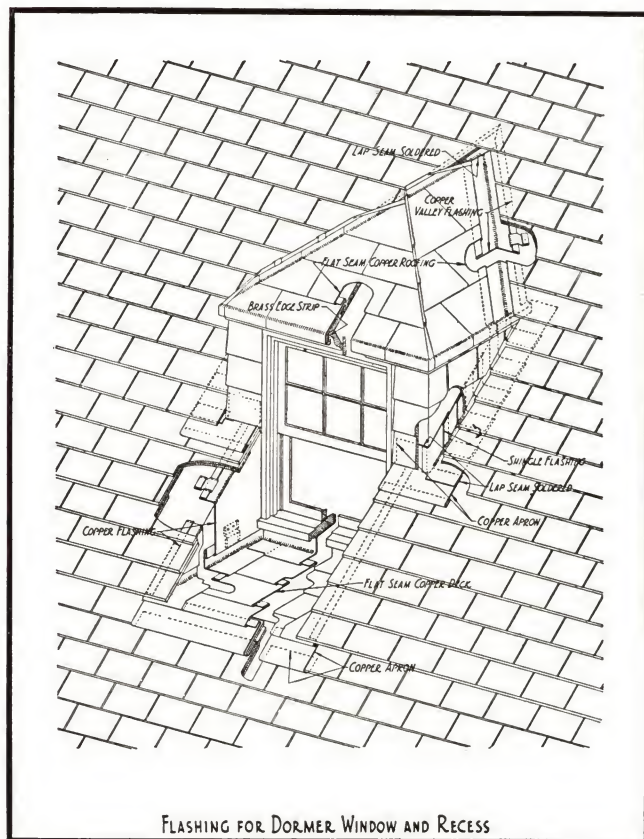
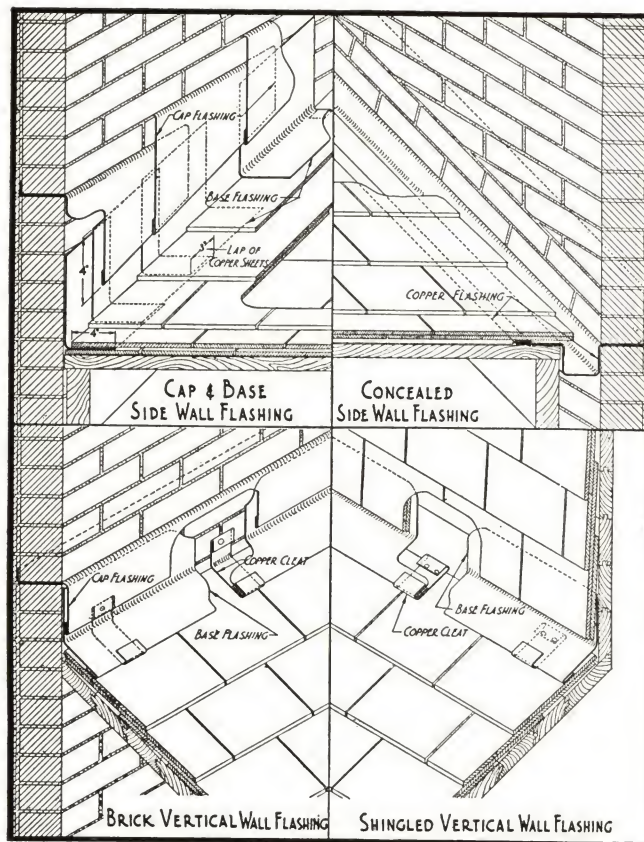
Joints where one roof surface intersects another to form a valley, at gutters, and where parts of building project above or through roof, such as chimneys, dormers, vents, etc., are sources of possible trouble from leaks.

Valleys and gutters are not to be catch-basins or reservoirs, but channels to lead water away. Wall flashings should be designed and placed to turn all water and moisture to outside face, where additional means of drainage should be provided.

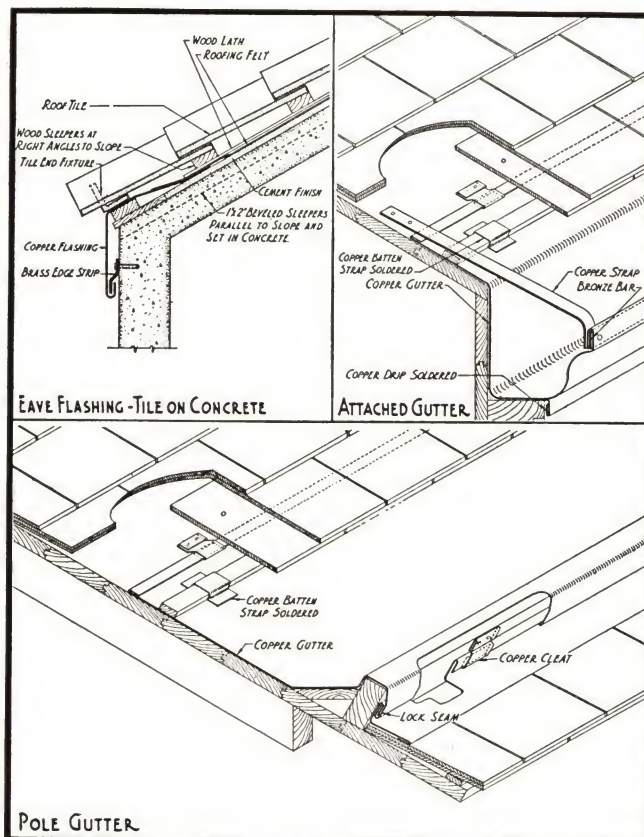
Leaks in flashings may be caused by breaks in material due to corrosion or mechanical failure, or defective protection of joint. General acceptance of copper as the best metal for flashings and accessory parts is due to its many fine qualities, including lightness in weight, ductility, ease of handling, and the fact that it resists corrosion.

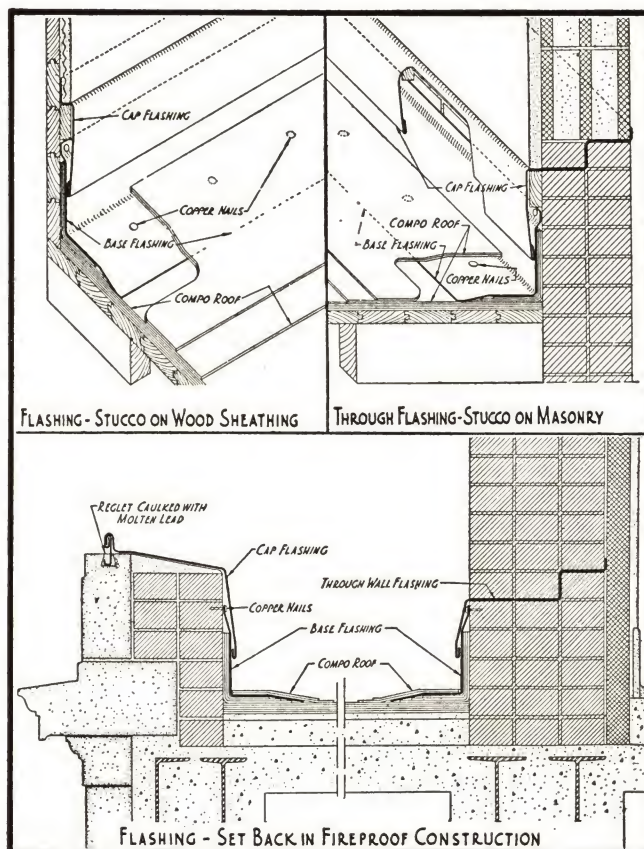
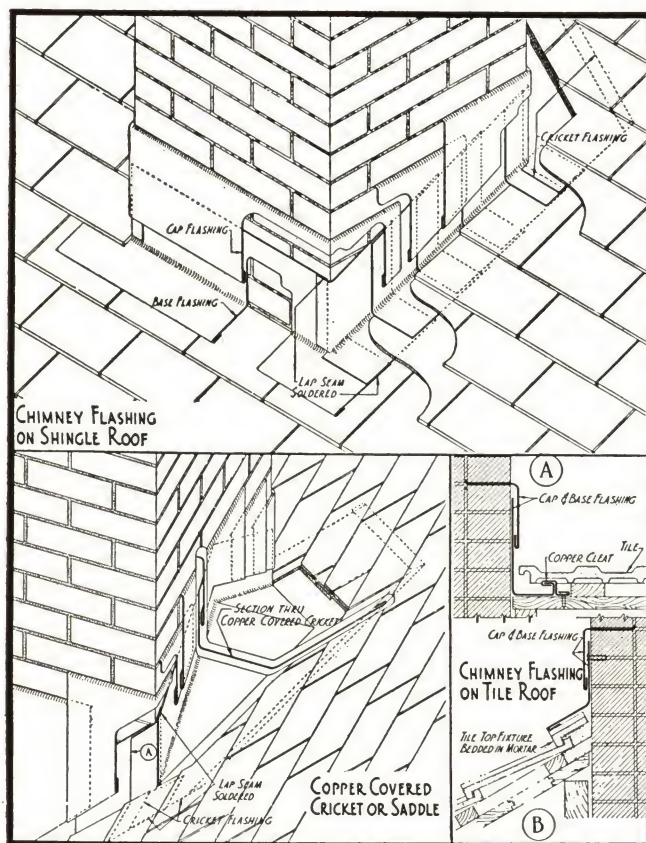
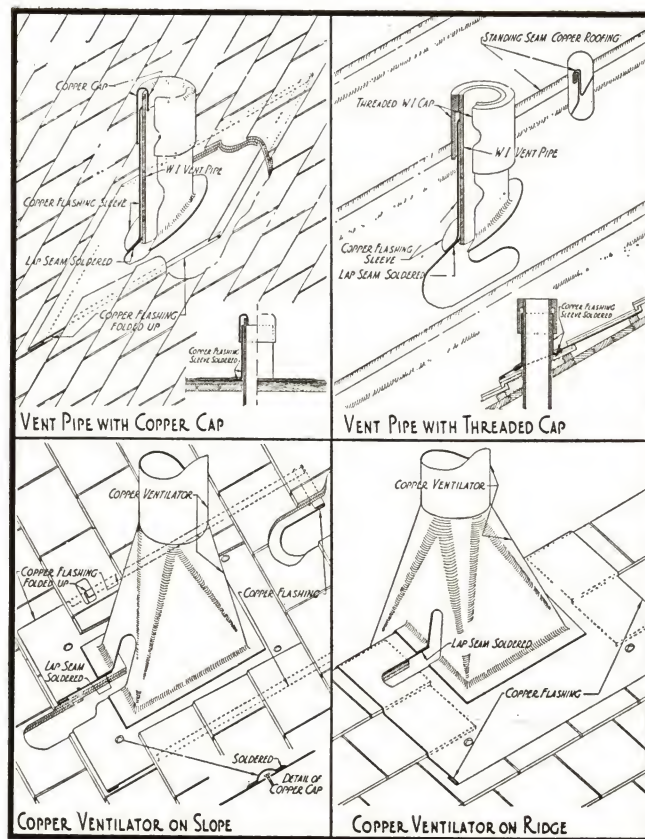
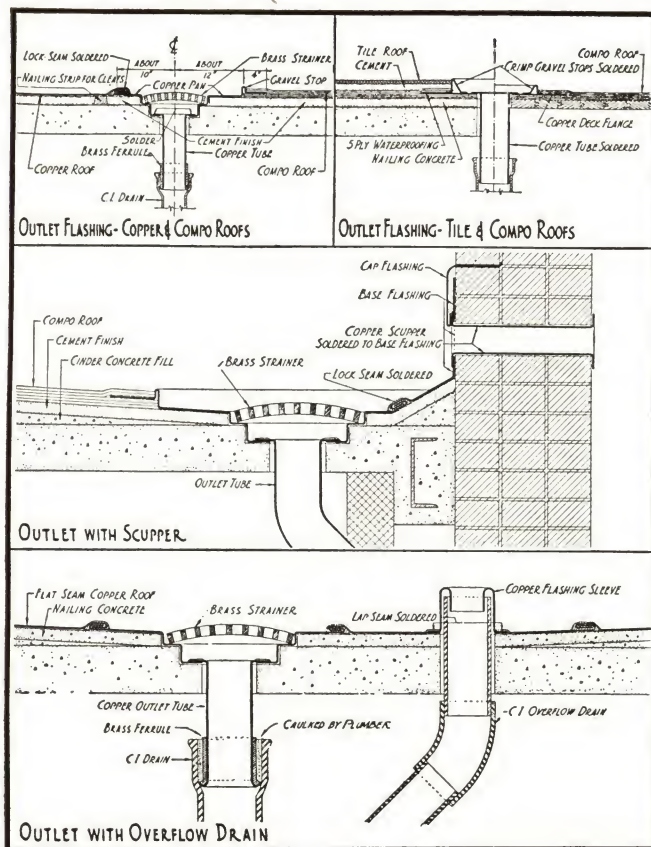
No matter how good a material may be available for a given purpose, if it is misused it cannot perform with satisfaction. Copper, as well as all other materials, must be used properly to give the fine service of which it is capable.

For Thru-Wall Flashing, (Cheney and Revere) see Pages 33 to 38. A handbook is available which gives considerably more flashing detail than is possible here.



FLASHING FOR DORMER WINDOW AND RECESS





FOR THRU-WALL FLASHING SEE PAGE 33



GUTTERS

An ideal drainage system must be designed so it will carry away the water shed by the roof, most efficiently. Roofs, flashings and valleys should be constructed to shed the water and turn it toward gutters and outlets as speedily as possible. Gutters and leaders should have capacity for the maximum amount of water and yet not making them too large to be wasteful. Outlets should be designed to transfer the horizontal gutter flow into vertical leader flow with the greatest efficiency.

COMMON FAULTS The following give some faults to be avoided in gutter design and show they can be overcome:

1. Gutters or outlets too small, or of improper shape.

If gutter is too small, or if the outlets will not permit the leaders to empty the gutter fast enough, water or snow either backs up behind flashings and leaks into the building or spills over the outside causing staining and other troubles.

2. Improper spacing or number of leaders.

If the leaders are insufficient in number, too small, or spaced too far apart, the water is not drained fast enough and overflow results.

3. Expansion and contraction neglected.

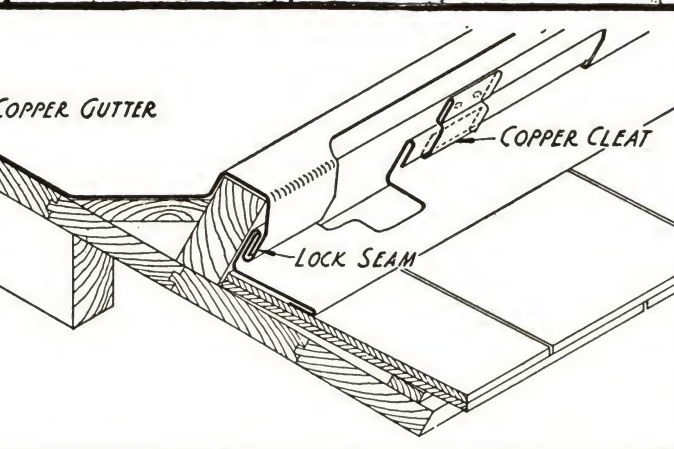
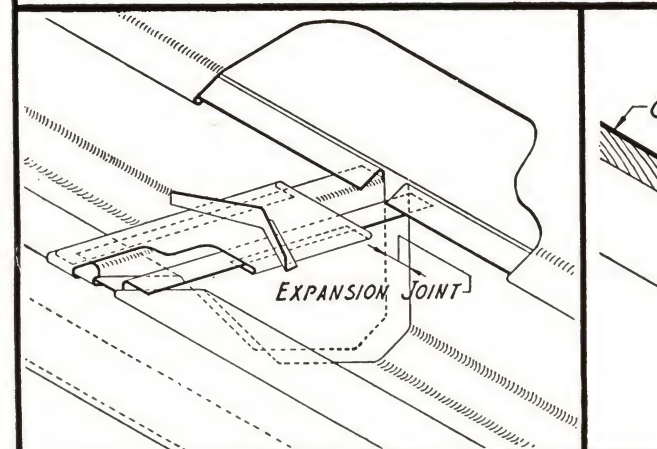
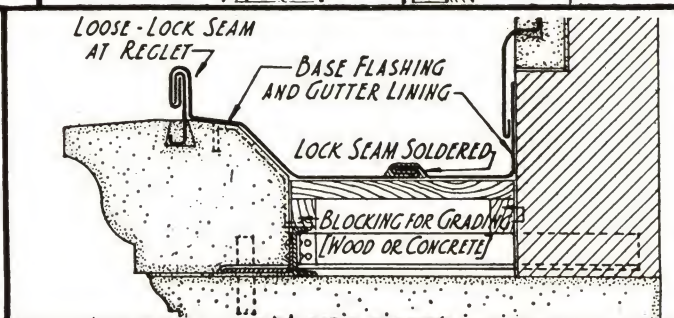
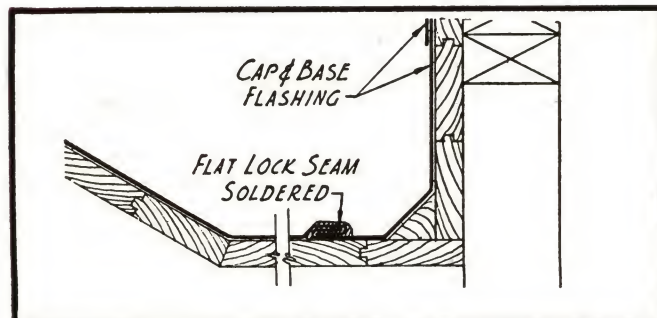
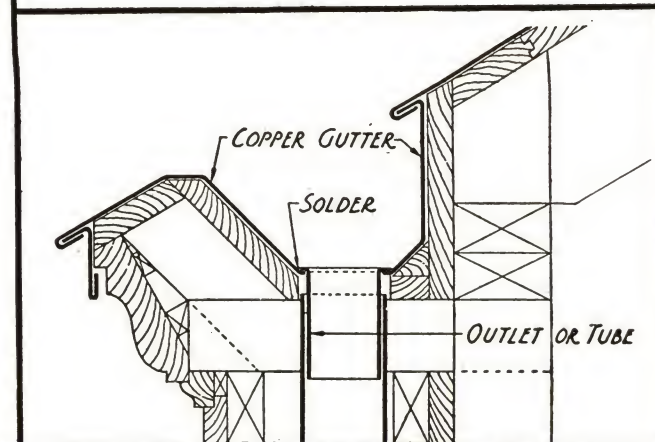
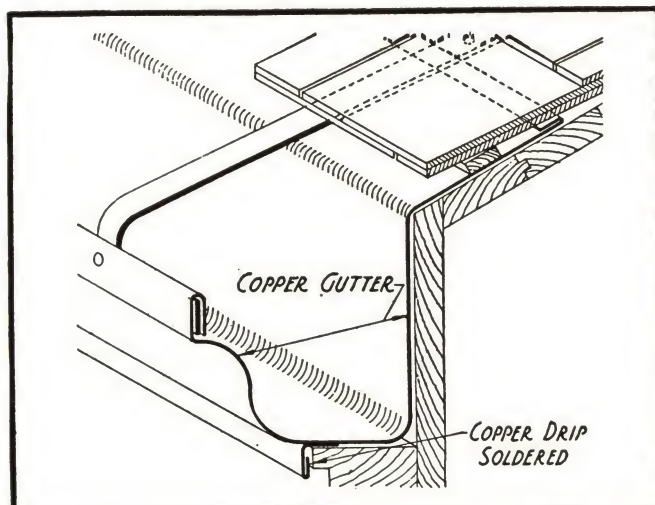
Expansion and contraction must be cared for or the metal will buckle and break, and leaks result. See drawing in lower left corner of this page.

4. Lack of scuppers or overflow drains.

If these are not provided for enclosed roof areas, stoppage will cause an overflow.

5. Improper provision for snow and ice.

Gutters should have all the slope possible, which means high points and short runs in shallow gutters between carefully spaced outlets.



A FEW EXAMPLES OF PROPER GUTTER DESIGN

PROPORTIONING GUTTERS The design of the various portions of a drainage system as far as capacity is concerned is dependent upon the amount of water to be handled. This in turn depends upon the rainfall in the particular locality and the amount of roof area tributary to the unit in question.

The roof area used in computations should be the actual area and not the horizontal projection of the area. Rain seldom falls vertically, and the maximum condition exists when it strikes perpendicular to the roof surface, making the total area effective.

GUTTER DESIGN

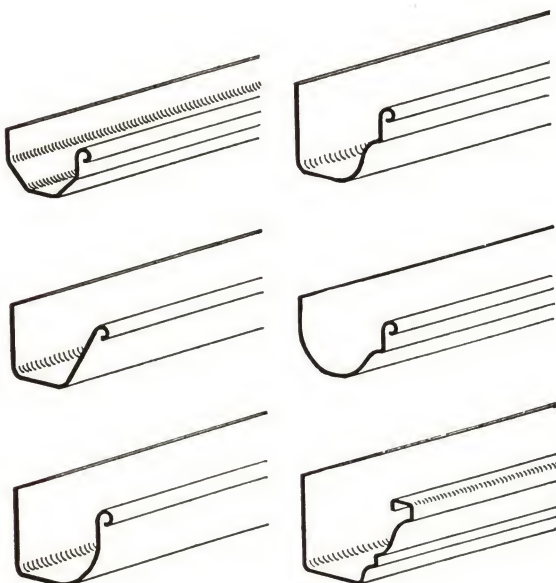
RESIDENCE WORK Judgment plays a large part in the design of gutters. The type of structure and the requirements as regards overflow have an important bearing in the matter.

The best type of gutter has the minimum depth equal to half and the maximum depth not exceeding three-quarters of the width. Thus the width becomes the deciding factor in proportioning its size. There is no reason for a gutter deeper than three-quarters of the width except for ornamental purposes, and for practical reasons it is distinctly desirable to keep the gutter shallow. Assuming that this proportion is observed the gutter may be referred to by its width only.

MONUMENTAL BUILDINGS This title is here used to refer to all installations where the conditions are such as to require very *adequate* and *liberal design* in order to insure against any possibility of gutter overflow. Such conditions exist for the most part in special cases of monumental structures where the arrangement is such that a single overflow is to be avoided as having serious consequences.

MOULDED GUTTERS AND TROUGHS

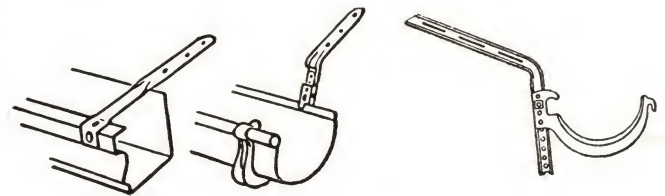
In addition to the built-in type of gutters that are an integral part of the roof—pre-moulded types are available. Half round types are stocked throughout the country. The moulded types (a few styles shown below) are usually made up as required by the roofing contractor.



REVERE COPPER AND BRASS INCORPORATED

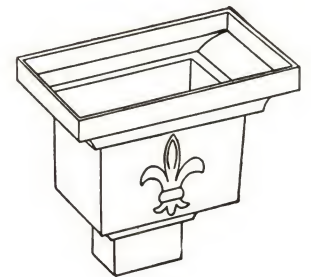
GUTTER HANGERS

There are many kinds of copper hangers on the market, most of which are satisfactory for the special conditions for which they are made. Several varieties, but by no means a complete selection of those available, are illustrated.



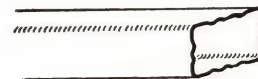
LEADER HEADS

A typical ornamental leader head, of stock design is shown below. A number of other stock designs are readily available or special designs can be quickly made up, in which case the number required largely controls the cost of manufacture. An ideal metal to use for ornate needs is Leadtex. This metal is fully described on pages 21 to 26.



LEADERS

Leaders or conductors are made in four different shapes. Special designs may also be had upon application. Plain round leaders are not generally stocked by manufacturers and jobbers. They are not generally used because, they do not resist freezing



RECTANGULAR CORRUGATED



CORRUGATED ROUND

as well as do the corrugated ones. Moreover the latter are more pleasing in appearance when in place than are the plain ones. Sixteen ounce leaders are regularly furnished in 10' lengths.

LEADER STRAPS

A typical flat type leader strap is illustrated below. Many other types of flat and cast straps are regularly stocked by supply houses.



NOTE: Copper or lead-coated copper gutters, leaders, trough, leader straps and other accessories are not manufactured by Revere Copper Brass Incorporated. However, a list of reputable fabricators using Revere copper or lead-coated copper will be furnished upon request.

The Revere mark is an identification of quality on gutters and downspouts.

SPIRES, DOMES AND TOWERS

Special forms of roofing, as spires, domes and towers, should be designed after full consideration of special features involved, but the main principles of sheet copper application should be adhered to in every case. Neither architect nor competent sheet metal contractor should have difficulty with particular installations.

There are many possible forms of domes and spires. These usually are covered with copper because of its lasting qualities. Freedom from deterioration over long periods is very important for such installations where expensive scaffolding is necessary for repairs.

Standard methods of copper application all are suitable for covering spires, domes or towers, and the decision of which to use will depend upon architectural considerations and specific features of the case in hand. For instance, on a small dome, the batten method probably would not be artistically appropriate or easy to apply because of sharpness of the curvature. The flat seam method could be used with entire satisfaction.

In using the batten seam method on towers and domes, rib spacing should be worked out carefully so all bays will be identical. Patterns usually are made of roofing paper or iron. Cross seams may be staggered, and if decided on it is advisable to lay out two sets of patterns for alternate bays. Where curved or double-curved surfaces are to be covered, the size of sheets should be limited to cover an area which departs only slightly from a flat surface. On very sharp curvatures difficulty is encountered in forming battens, and in keeping longitudinal seams from binding, it is better to use flat seam construction.

Flat seam roofing is applicable to virtually all styles of domes and towers. As in flat roofing work, it is best to use small sheets. On domes the sheets usually vary in size from one course to the next, but those in any one course generally are made from the same pattern. When laid in horizontal rings, vertical joints should be staggered. Sheets also may be laid with diagonal seams, if that effect is more desirable.

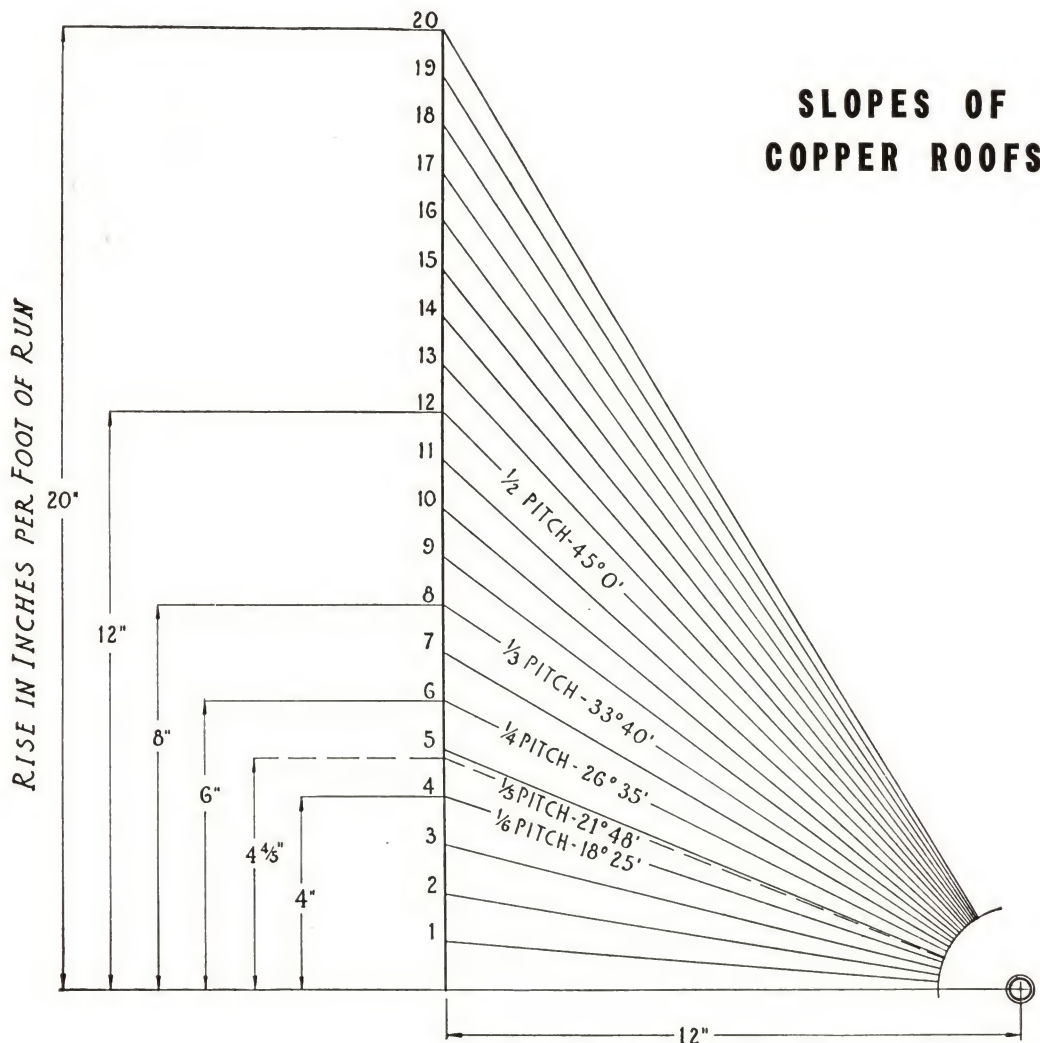
TECHNICAL INFORMATION

The slopes of a roof, having been determined by style or architectural design of the building, and climatic and drainage considerations, will determine in large measure the application of copper, both as to standard method to be employed and details of its use.

(A) BATTEN SEAM
Can be used on slopes of 3" per foot and greater.

(B) STANDING SEAM
Can be used on slopes of 2½" per foot and greater.

(C) FLAT SEAM Can be used on slopes of ¼" per foot and greater.



WEIGHTS OF COPPER SHEETS

Copper sheets are made in all weights and gauges up to a thickness of $\frac{1}{4}$ ". Greater thicknesses are classed as plates. The weight of copper sheet used should be governed by the type of service required of it.

Sixteen-ounce copper has been shown by experience to be the minimum weight for gutters and leaders and most types of flashings; also for roofing work on large structures and in congested localities. Copper installations which have lasted through the years are 16-ounce or heavier.

Under special conditions of unusual exposure or heavy duty, where corrosion and erosion are both severe, the weight of copper should be increased. For example, on roofs of heavy

slates or tiles 18-ounce or 20-ounce copper flashing is recommended.

In suburban or rural locations, 10-ounce copper, properly installed, is considered satisfactory for sloping roofs of residences and for small roof areas. However, 16-ounce copper is recommended for flashing, valleys, leaders and gutters used in conjunction with the lighter weight roofing copper. Nothing lighter than 16-ounce copper should be used for flat areas which demand the soldered flatseam construction and where conditions are more severe than on steep slopes.

The gauge of sheet copper is expressed by the ounce weight per square foot; "16-ounce copper" means copper weighing 16-ounces per square foot.

TABLE OF SIZES AND WEIGHTS OF COPPER SHEETS
Regularly Stocked by Sheet Metal Distributors (other sizes available on order)

ROOFING TEMPER		CORNICER TEMPER		STRIP COPPER	
SIZE and WEIGHT	Estimated Pounds Per Sheet	SIZE and WEIGHT	Estimated Pounds Per Sheet	SIZE and WEIGHT	Estimated Pounds Per Sheet
Soft Sheet Copper		Cold Rolled Sheet Copper		Cold Rolled Strip Copper	
14 Oz. 20" x 96"	11 $\frac{3}{4}$	14 Oz. 20" x 96"	11 $\frac{3}{4}$	16 Oz. 10" x 96"	6 $\frac{3}{4}$
24" x 96"	14	24" x 96"	14	12" x 96"	8
30" x 96"	17 $\frac{1}{2}$	30" x 96"	17 $\frac{1}{2}$	14" x 96"	9 $\frac{1}{3}$
36" x 96"	21	36" x 96"	21	15" x 96"	10
16 Oz. 20" x 96"	13 $\frac{1}{3}$	16 Oz. 20" x 96"	13 $\frac{1}{3}$	COPPER IN ROLLS	
24" x 96"	16	24" x 96"	16	Soft Copper in Rolls	
30" x 96"	20	30" x 96"	20	16 Oz. 6"	
36" x 96"	24	36" x 96"	24	7"	
18 Oz. 20" x 96"	15	18 Oz. 20" x 96"	15	8"	
24" x 96"	18	24" x 96"	18	10"	
30" x 96"	22 $\frac{1}{2}$	30" x 96"	22 $\frac{1}{2}$	12"	
36" x 96"	27	36" x 96"	27	16 Oz. 14"	
20 Oz. 20" x 96"	16 $\frac{2}{3}$	20 Oz. 20" x 96"	16 $\frac{2}{3}$	16"	
24" x 96"	20	24" x 96"	20	18"	
30" x 96"	25	30" x 96"	25	20"	
36" x 96"	30	36" x 96"	30	10 OUNCE COPPER ROOFING	
24 Oz. 20" x 96"	20	24 Oz. 20" x 96"	20	10 Oz. 16" x 72"	5
24" x 96"	24	24" x 96"	24	(One size only)	
30" x 96"	30	30" x 96"	30	PARALLEL EDGE STRIP COPPER	
36" x 96"	36	36" x 96"	36	Each Strip Stamped "Revere Standard 16 Oz."	
32 Oz. 20" x 96"	26 $\frac{2}{3}$	32 Oz. 20" x 96"	26 $\frac{2}{3}$	For the manufacture of Gutters and Leaders,	
24" x 96"	32	24" x 96"	32	this is furnished in exact lengths of 120 inches	
30" x 96"	40	30" x 96"	40	to 124 inches only; in widths from over 6 inches	
36" x 96"	48	36" x 96"	48	to 19 $\frac{1}{2}$ inches inclusive.	

In 16 Oz. Sheet Copper only, lengths of 120" are also considered stock sizes in the widths shown above for 96"

TEMPER OF COPPER SHEETS

Copper sheets are made in varying degrees of temper, or hardness. Experience has established two of these as best suited for building construction. The industry has come to know these as "soft" or "hot-rolled," and "hard" or "cold-rolled" copper; and it is common practice to designate the sheets in specifying or ordering. These terms sometimes have caused misunderstanding and it is recommended that the two tempers be referred to as "roofing temper" and "cornice temper." Manufacturers know definitely what these degrees of hardness are; first is soft-rolled and second hard-rolled, to be

sure, but the amount of temper is fixed. The trade and architectural profession, therefore, are urged to employ the following terms, which are in fairly general use:

Instead of	Use
Soft	Soft (Roofing Temper)
Soft-rolled	abbrev. (R. T.)
Hot-rolled	
Hard	Hard (Cornice Temper)
Hard-rolled	abbrev. (C. T.)
Cold-rolled	

TEMPER FOR VARIOUS USES

Use soft (R.T.) copper for roofing, all flashing, and counter-flashing work; also in all other places where shaped or formed work is supported, such as in built-in or box gutter linings, etc.

Use hard (C.T.) copper for all hanging gutters, eaves, troughs, downspouts, cornices—or wherever stiffness is necessary to support or maintain shape and contours of the work.



SOLDERING

Soldering and soldered seams should be avoided where possible. There are many instances in sheet copper work, however, where solder is necessary, and in these the joints must be tight and strong.

Success in soldering depends in great measure on the care exercised in cleaning the surfaces, for solder will not adhere to a dirty or greasy surface. Fluxes are used to remove and prevent the further formation of oxide, as solder will not adhere to an oxidized surface.

Joints to be soldered should be closely fitted together. It is a mistake to suppose an excess of solder will give a strong joint.

In all applications it is important to eliminate solder wherever possible, so that the sheets will be free to move. The copper should be laid with proper consideration to present and future temperatures, and the seams formed, and if necessary treated, so that watertightness will be assured and buckling prevented.

CLEATS FOR COPPER WORK

Cleats should be made of 16-oz. soft (R.T.) copper, not less than $1\frac{1}{2}$ " wide, and should be fastened with two copper or copper alloy nails. A width of 2" is preferable, as it gives a stronger cleat and removes possibility of the nails tearing out. The nails should be placed in line parallel to the edge of the sheet to keep the cleat from turning. The end of the cleat must be bent back over the nails to prevent the nail heads from cutting the sheet.

The length of the cleat is determined by the kind of seam with which it is used.

The maximum spacing of cleats should not exceed 12"; a spacing of six or eight inches is recommended. This does not apply to concealed valley flashings, etc., where the sheet or

strip is held by the roof covering. Under these conditions the spacing may be increased considerably; a maximum of 24" is recommended.

The cleat holds the copper sheet. If it also secures a second sheet, it is folded in with the sheets as the seam is formed. In such cases the cleat must be nailed down before the sheets are brought together.

Proper cleating is highly important on large flat seam roofs. Here the seams usually are soldered to make the work watertight, and expansion and construction movements are allowed for in the cleats, which also should restrict these movements to the individual sheets.

NAILS

Some flashings such as those around windows, doors, and gravel stops, must be nailed. The flashing strip is fastened only along one line, and is free to move to and from the line of nailing. The longitudinal movement is cared for by placing the nails a short distance apart and by the use of soft (R.T.) copper.

The danger of using iron or steel nails with copper cannot be over-emphasized. No economy results from saving a few dollars in nails which corrode and thereby ruin the roof.

The proper nails to use with sheet copper are large flat-head

wire nails. These differ from ordinary wire nails in design of head and of the shank immediately under the head. The ordinary wire nail has a ridge or shoulder under a smaller head. This makes it impossible to drive the nail home without injuring the sheet.

1. Use only copper or copper alloy nails; never use iron or steel.

2. Flat-head wire nails not less than No. 12 gage and not less than $\frac{7}{8}$ " long are recommended for wood and nailing concrete.

SURFACES FOR LAYING COPPER

Before applying copper to any surface it should be smooth and even, and free from all small projections and hollows. Surfaces should be absolutely dry when copper is laid.

WOOD SHEATHING Proper wood sheathing forms an excellent laying surface for sheet copper. It should be firmly nailed down, all joints true and even and all nail heads set. No copper should be laid unless the boards are thoroughly dry.

CONCRETE AS A BASE When copper is laid on concrete the surface should be made smooth by a wash of neat cement. Heavy coats of asphalt paint also are satisfactory for this purpose.

Cinder concrete should not be used in contact with copper

because the cinders may have ingredients which combine with moisture of condensation to form injurious solutions.

GYPSUM AND MISCELLANEOUS LAYING SURFACES Gypsum also is well adapted for use as a base for copper roofing. What has been said of concrete also will apply to this material, except that gypsum can be nailed into directly. It is important, however, that the proper nails be specified to give necessary holding power.

BUILDING PAPER OR FELT Under all copper roofing, valleys and gutter linings, a waterproof building paper or roofing felt should be used. It provides a smooth surface to contact the copper, and when properly lapped protects it against moisture from condensation.

MAINTENANCE OF COPPER WORK

Copper work requires little or no maintenance if properly installed. No painting is necessary, and its attractive green patina, which forms in time, is a protection as well as a beautifier. Periodic inspection should be made as a matter

of routine to see that no physical damage has been done, to insure unclogged outlets, and to remove all foreign matter that may have been deposited on the roof.

REVERE LEADTEX

LEAD—COATED COPPER

WHAT IT IS....

Leadtex is Revere Sheet Copper which has been coated with lead by a special process which produces a uniform coating with a perfect bond. It combines workability, light weight, permanence and economy of sheet copper with mellow color, decorative range and protective finish of lead. It is available in three finishes on a base of 10 to 20 ounce copper.

WHERE IT IS USED....

For hundreds of years lead has been used successfully for architectural purposes, due to its easy workability and high resistance to weathering. Freshly worked or cut lead has a lustrous metallic cast which turns into a soft gray tone when exposed to the atmosphere, harmonizing with practically all materials of construction.

The value of lead in regard to protection and appearance does not depend on its thickness. However, lead possesses very little strength, and in employing it for a building material it is necessary as a rule to use relatively thick lead sheet to give sufficient rigidity to the construction. Since lead has a high density, the possibility of obtaining a lighter construction material possessing advantages of both lead and copper is welcomed by the building trade.

Leadtex can be used in practically any type of building regardless of architectural style. It ensures permanence and quality of construction for:

Roofing	Ornamental motifs
Flashings	Domes
Gutters	Turrets
Leaders	Skylights
Leader heads	Crestings
Cornices	Marquises
Spandrels	Panels
Store fronts	Curved Surfaces
Balustrades	Thru-Wall
Dormers	Flashing

The use of Leadtex for decorative purposes is described in the section on Architectural Sheets and Shapes (see file index).



An attractive Lead Coated Copper porch roof of standing seam construction adds to the appearance of this residence



Ornamental Fletche and Batten Seam Roof of Leadtex, Metropolitan M.E. Church, Washington, D. C. 20,000 pounds of Revere Leadtex were used on this job. Sundt and Wenner, Architects. Stofflet and Tillotson, General Building Contractor. Chew-Bittel Company, Sheet Metal Contractor — all of Philadelphia, Pa.



SPECIAL ADVANTAGES OF LEADTEX

THE FINISH Is similar to lead as far as weathering and lasting qualities are concerned.

STIFFNESS On account of the additional strength and stiffness given by the copper, Leadtex can be used in the same manner and for the same purpose that copper has always been used.

LIGHTWEIGHT Because of its lightness as compared to sheet lead, the construction weight of roofs, domes, spandrels, ornamental motifs and the like, may be greatly reduced.

This is an important consideration in modern building construction. The use of Leadtex for spandrels is very well illustrated in the photographs of spandrel panels on page 25.

NON-STAINING The lead coating prevents the staining of other adjacent building materials through the action of the elements, which on exposed copper sometimes causes a green stain. This is likely to occur particularly when the material is in the proximity of salt water or where it is exposed to the action of sulphur fumes from smoke. Under such conditions it is recommended that Leadtex be used as flashing, if in contact with stone, marble, stucco, or cement work.

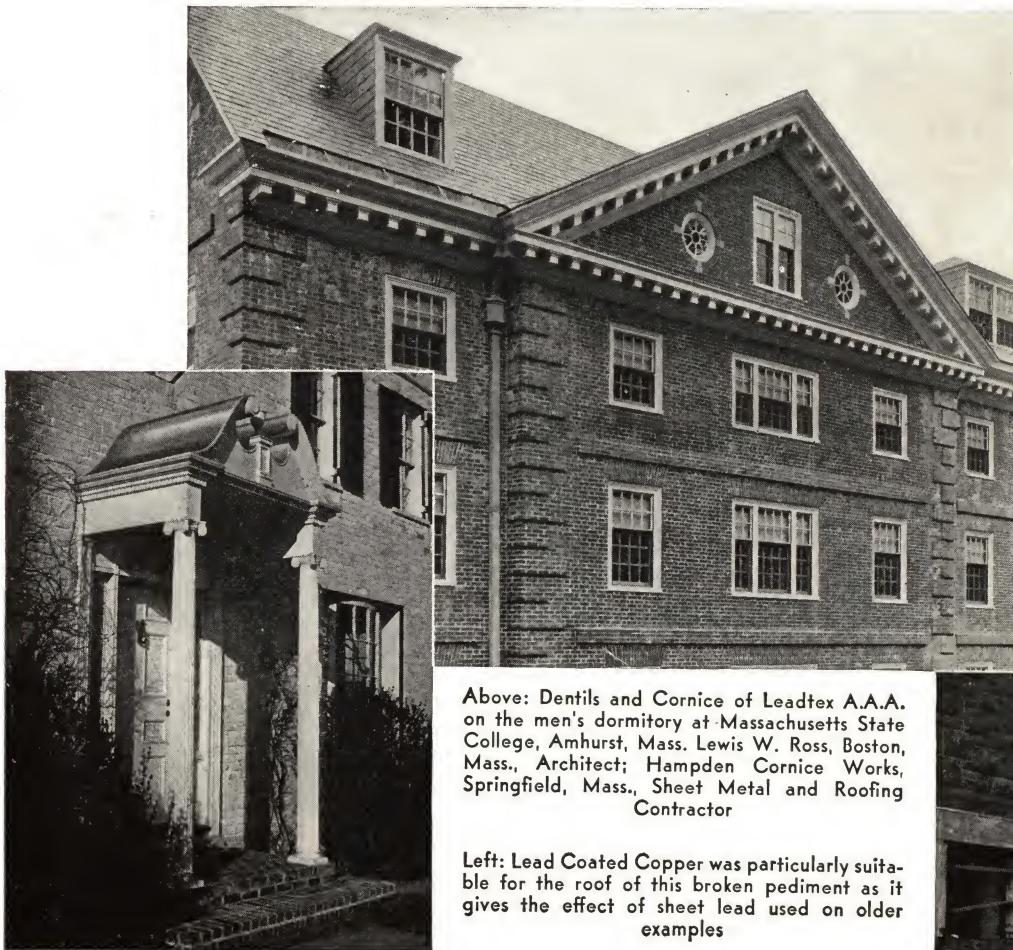
RELIEF AND ORNAMENT The properties of copper which make it possible to stamp or form it readily with faithful reproduction of detail is improved by the lead coating of Leadtex. This makes Leadtex especially adaptable to ornamental constructions.

COLOR The natural color of Leadtex is a soft, neutral tone which harmonizes well with almost any material and color scheme. It ages beautifully, weathering to a dark antique gray. Where it is desired to have the dark tone from the first, it may be produced by chemical treatment.

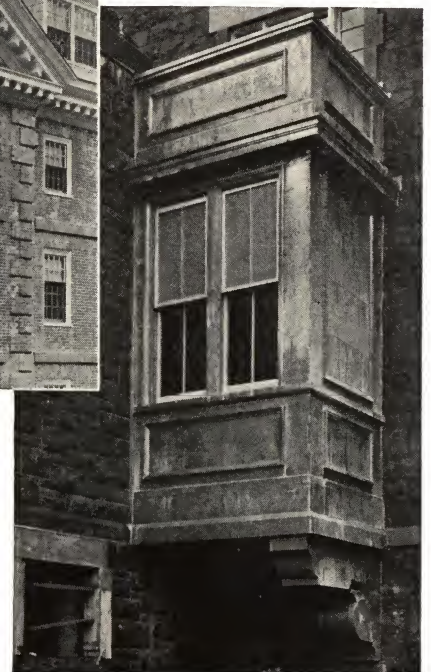
COST Of real importance to the architect is the fact that Leadtex costs but little more than plain sheet copper.

READILY AVAILABLE Leadtex is distributed throughout the country and is readily and quickly obtained by the sheet metal trade through authorized distributors of Revere products. Samples of Leadtex in its various finishes will be sent gladly to any architect.

We will also assist architects with all problems they may have regarding special details or applications of Leadtex. Our nearest office will answer any communications concerning this or other Revere products.



Below: Leadtex was used extensively in the restoration of St. Michael's Passionist Church of Union City, N. J. Schreck and Waelty Inc., Jersey City, N. J., Sheet Metal Contractor



Above: Dentils and Cornice of Leadtex A.A.A. on the men's dormitory at Massachusetts State College, Amhurst, Mass. Lewis W. Ross, Boston, Mass., Architect; Hampden Cornice Works, Springfield, Mass., Sheet Metal and Roofing Contractor

Left: Lead Coated Copper was particularly suitable for the roof of this broken pediment as it gives the effect of sheet lead used on older examples

TYPES OF LEADTEX

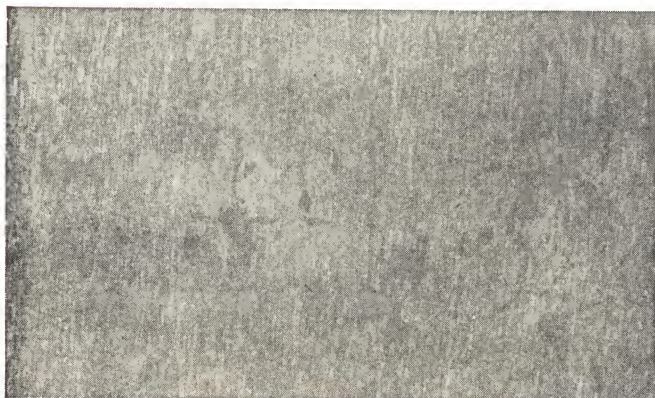
Revere, which has been a pioneer in the production of lead-coated copper now offers for sale three types known as Leadtex "15" and Leadtex "25" and Leadtex AAA. The first two are new types which are decided improvements in quality over all previous types of lead-coated copper regardless of manufacture.

The quality of lead-coated copper depends almost exclusively upon the uniformity of the lead coating and the bonding of the lead to the copper.

In Revere's new Leadtex, the lead is applied uniformly to the copper sheet and a perfect bond is obtained. Extensive laboratory tests and accelerated corrosion tests indicate the marked superiority of Leadtex "15" and Leadtex "25" for both architectural and industrial uses.

IDENTIFICATION Every sheet of Leadtex is marked with the Revere Red, White and Blue label indicating weight of coating and base and type of finish.

LEADTEX "15"



Leadtex "15" has quite a smooth surface yet there is sufficient texture to make it architecturally attractive. It can be used for roofs, eaves troughs, leaders, etc., and for decorative purposes when embossed designs are not required in extremely fine detail. It can be painted, when design requires, without special cleaning or priming coats which cuts painting costs.

WEIGHTS Leadtex "15" is furnished coated both sides with a coating of $7\frac{1}{2}$ pounds of lead per 100 square feet per side or 15 pounds per 100 square feet if coated both sides. The base may be 10 to 20 ounce copper in either hard or soft temper.

LEADTEX "25"



Leadtex "25" has a rougher surface than Leadtex "15" but the finish is unusually smooth and uniform considering the thickness of the coating. The texture is pleasing and has no resemblance to mechanically produced textures. It fits in with all types of rugged designs but is more limited than Leadtex "15" and AAA where embossed detail is required.

WEIGHTS Leadtex "25" is furnished coated both sides with a coating of $12\frac{1}{2}$ pounds of lead per 100 square feet per side or 25 pounds per 100 square feet if coated both sides. The base may be 10 to 20 ounce copper in either hard or soft temper.

LEADTEX AAA



Leadtex AAA has a smooth surface in which the lead is uniformly distributed. It is recommended for flashings, roofing and ornamental stampings where the texture is not important; where for the sake of design the metal must be painted, Leadtex AAA usually is specified. The surface takes lead and oil paint perfectly and no priming is necessary.

WEIGHTS Leadtex AAA is coated on one side only unless otherwise specified. The weight of coating may be $7\frac{1}{2}$ to $12\frac{1}{2}$ pounds per square foot per side on a base of 10 to 20 ounce copper with either hard or soft temper.



LEADTEX FOR ROOFING, FLASHING, ETC.

Since Leadtex is produced with a copper base, it retains all the properties which make copper such a widely used construction material. In addition it offers the soft tones of lead which harmonize so well with a variety of building materials. Structurally Leadtex can be considered wherever copper is used and its application is essentially the same. Reference should be made to the pages indicated below for further information on specific applications. A few differences in the handling of Leadtex are noted on page 26.

	<i>Page</i>
Standing Seam Roofs	5-7
Flat Seam Roofs	8-10
Batten Seam Roofs	11-13
Spires, Domes and Towers	18
Gutters and Leaders	16-17
Thru-Wall Flashing	33-38
Spandrel Waterproofing	39
Specifications	27
Decorative Uses—	

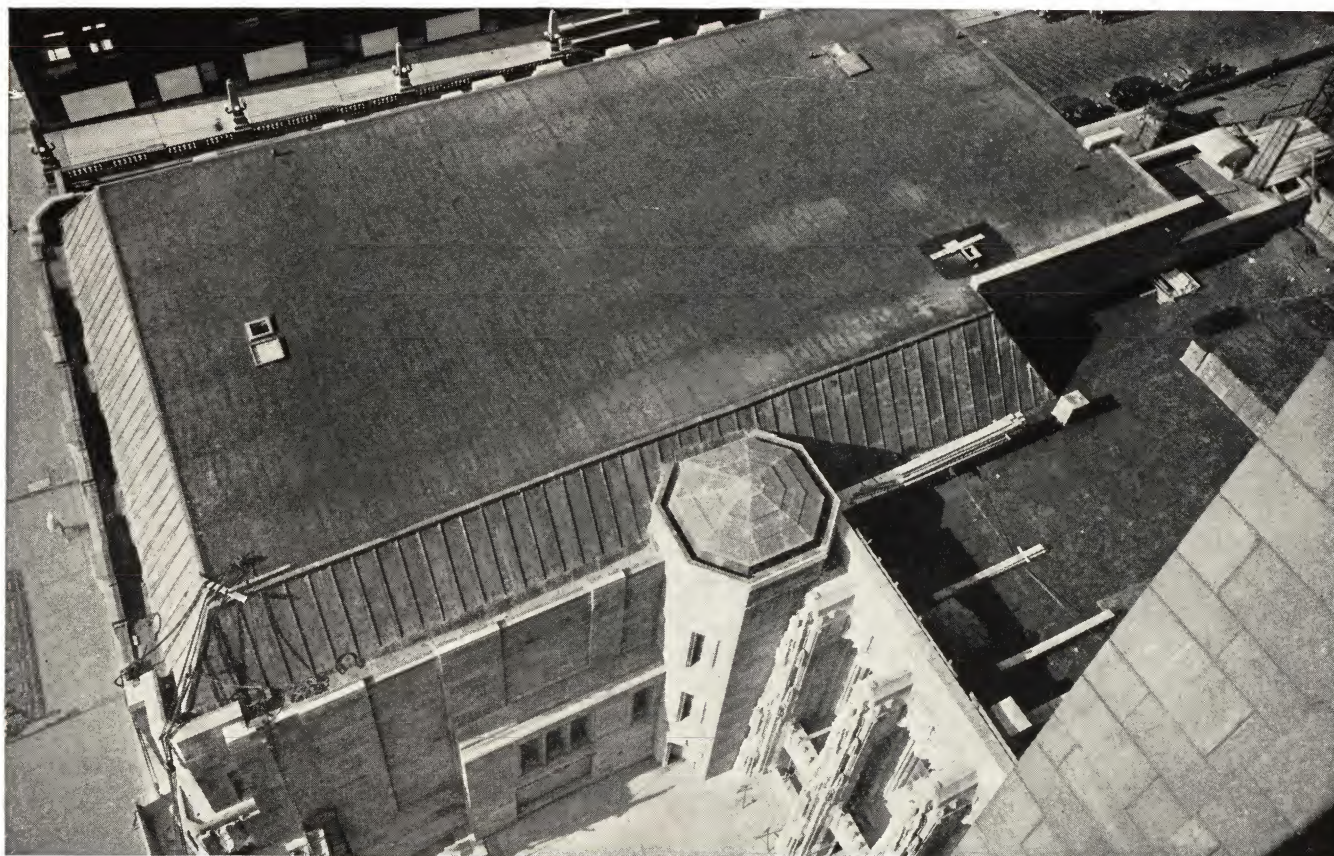
See Catalog on Architectural Sheets and Shapes



An interesting roof of Lead Coated Copper. Standing seam construction throughout



A Curved Ornamental Leadtex Leader, St. Pascal's Church, Chicago, Ill. B. J. Hutton, Architect; Raymond Gregori, Associate; Wagner Bros. Cornice Co., Chicago, Sheet Metal Work; Friedley-Voshardt Co., Chicago, Stamping



WGN Broadcasting Studio, Chicago, Ill. 16 oz. Leadtex was used for mansard roof, gutters and turret. John M. Howells, Hood & Foulhoux, New York City, Architect; L. J. Weissenborn, Chicago, Associate Architect; R. C. Weiboldt Company, Chicago, General Contractor; L. H. Sohn Company, Chicago, Sheet Metal Contractor

LEADTEX SPANDRELS



Leadtex Spandrel, Pellissier Building, Los Angeles, California. G. Albert Lansburgh, San Francisco, Cal., and Morgan, Walls & Clements, Los Angeles, Cal., Architects; Stampings by Los Angeles Cornice & Stamping Works, Los Angeles, Cal.; Installation by National Cornice Works, Los Angeles, Cal.



Lead Coated Copper Spandrel used on the Eastern Outfitting Building, Los Angeles, California. Claude Beekman, Architect; Los Angeles Cornice Works, Stamping and Sheet Metal Work



Leadtex Spandrels, Hunter-Dulin Building, San Francisco, California. Shultze & Weaver, Architects, New York; Stampings and Installation by Forderer Cornice Works, San Francisco Cal.



Leadtex Spandrels, Hunter-Dulin Building, San Francisco, California. Shultze & Weaver, Architects, New York; Stampings and Installation by Forderer Cornice Works, San Francisco, Cal.

Spandrels vary in size and method of construction, as well as in the gauge of Leadtex used, depending on the nature of the work in hand. There is also a wide latitude in practice as to method of framing and connecting unit parts, as well as anchoring or securing them in place.

Because of the variety of design of spandrels, etc., specifications will depend on the conditions of each installation.

Leadtex can also be used with Macotta Spandrels.



These Revere Leadtex Spandrels are Three of the Five Designs Used in 512 Spandrels on William Taylor Hotel, San Francisco, California. They illustrate clearly the depth of the relief and the delicacy of detail with Leadtex. Lewis P. Hobart, Architect; Cahill Bros., General Contractors; Fabricated and installed by Forderer Cornice Works, all of San Francisco, Cal.



APPLICATION OF LEADTEX

In general, the method of applying Leadtex for roofing and other sheet metal work is the same as for plain sheet copper. Reference should be made to other sections of the handbook where application details will be found.

In selecting Leadtex the weight of the copper base should be the same as for uncoated material for similar uses. For roofing 16 ounces is usually considered the minimum and occasionally it is advisable to use a heavier weight. Leadtex may be obtained in either soft or hard temper and the selection between these two tempers should be on the same basis as for plain copper.

In actual use lead-coated copper sheets should be handled with care. Lead being a soft material, scratches and cuts easily and careful handling is necessary to prevent deep scratches or cuts that might possibly become the focal points of corrosive attacks.

Particular care must also be exercised in soldering. Neutral fluxes of the zinc chloride types are recommended. Either liquid or paste fluxes may be used. As a general rule, the paste flux is preferable, because it may be carefully applied with a brush and the tendency to swab on excessive amounts, which is always present when liquid fluxes are employed, is eliminated.

In the actual soldering operation, it is essential that the solder seams are well covered with the coating metal or with solder. A non-acid solder should be used.

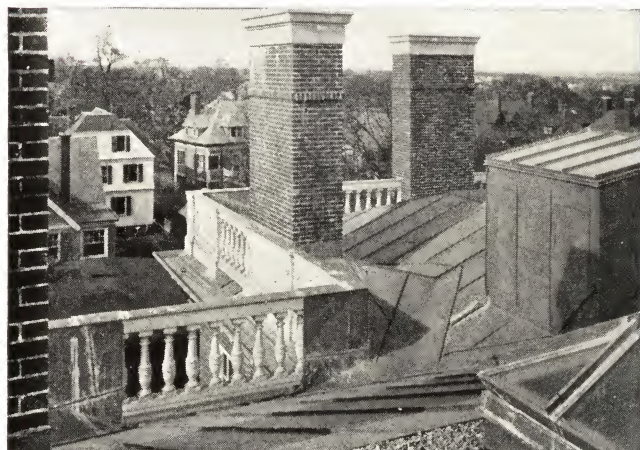
TO SPECIFY LEADTEX

Specify Leadtex in the same weights and temper ordinarily used for copper, denoting the weight of lead coating as given on page 23. In many cases the specifications for sheet copper may be adapted to Leadtex by using the material specification given below. See page 27 for roofing specification.

"All . . . shall be 16 ounce (or other weights) hard (or soft) copper base, Revere Leadtex "15" or "25" or AAA."

IDENTIFICATION

Every sheet of Leadtex is marked with the Revere Red, White and Blue label indicating weight of coating and base and type of finish.



Interesting Details of Lead Coated Copper Roof. Note the cricket valleys, gutters and balustrade and chimney flashings. Standing seam construction throughout



Leadtex was used for all roofing needs in the restoration of St. Michael's Passionist Church, Union City, New Jersey. Schreck and Waelty Inc., Jersey City, New Jersey

ROOFING SPECIFICATIONS

It would hardly seem necessary to stress the importance of proper and adequate specifications. The proper application of all materials in building construction is essential and this applies to copper as well as to the other materials. The specifications are the means of accomplishing this, and very often they are too meagre. They should be sufficiently detailed to cover every point of application, materials and workmanship accurately, and to permit of only the one proper interpretation of the detailed drawings.

As a safeguard to all the parties involved completeness in the specifications will go a long way toward insuring uniform bids and preventing unscrupulous contractors from taking advantage

of inadequate specifications to underbid reliable firms by cutting on material and workmanship.

It is further urged that the specifications or the general contractors ask sheet metal contractors to include in their bids the total number of square feet and total weight of the copper to be used. This will largely eliminate misinterpretation of specifications. The weight of metal can readily be compared with the number of square feet within the tolerance limits, to ascertain that the correct weight sheets are to be used. The number of square feet offers an easy way to compare the different contractors' interpretations of the specifications.

STANDARD SPECIFICATIONS FOR SHEET-COPPER WORK (Covering in Detail Roofing, Flashings, Roof-Drainage, etc.)

Notes

- (a) It should be noted that, wherever in this long specification Alternate Methods of doing work are described, they are designated by letter in order of recommended practice. In every case the first listed (letter A) describes recommended best practice.
- (b) Different Methods for different kinds of construction are collected under one general heading and sub-numbered 1, 2, 3, etc.
- (c) The arrangement of subjects has been made to agree, as nearly as possible, with the usual arrangement of sheetmetal specifications for the average building.
- (d) When it is desired to write a short specification to cover all the Sheet Copper Work on a building Item 1 alone may be used. There should then be a definite understanding between the contracting parties about Alternate Methods.

1. SHEET-COPPER WORK

Unless otherwise particularly specified, all sheetmetal work and all material and labor in connection therewith shall be furnished and performed in strict compliance with the recommended practice and Standard Specifications for Sheet-Copper Work of the Copper & Brass Research Association, 420 Lexington Ave., New York.

2. GENERAL

The General Conditions of the contract are hereby made a part of the contract and this contractor shall examine these General Conditions and thoroughly acquaint himself with all the requirements therein contained.

3. SCOPE OF WORK

Except as otherwise specified this contract includes the furnishing of all labor and materials necessary to complete in every respect, in accordance with the best practice, all the Sheet-Copper work of every description for this building.

4. GUARANTEE

Before final payment the contractor shall give to the owner a written guarantee which shall specify the kind, weight and manufacturer of the materials used, and shall guarantee his work free from all defects of workmanship for a period of two years after completion and shall make good all defects and all damage to the building from leaks during that time. If so directed by the architect this contractor shall execute a proper guarantee bond.

5. CONTRACTOR TO EXAMINE SURFACES

This contractor shall carefully examine all surfaces prepared for flashings, etc., by other trades, shall point out all defects, and shall see that the necessary corrections are made before proceeding with his work.

This contractor shall arrange his work so as to cooperate at all times with other trades and prevent delay or damage to other work.

6. PRECAUTIONS AGAINST DAMAGE DURING CONSTRUCTION

During construction care shall be taken to prevent damage to sheet-copper work in place by walking or placing heavy materials thereon. As soon as soldering is done, the work shall be thoroughly cleaned. Toward completion, all damaged work shall be repaired, shall have all stains and debris removed, and shall be left in perfect condition.

7. PREPARATION OF SURFACES (OTHER CONTRACTORS)

All surfaces to receive flashings shall be made smooth and even, and free from all small projections or hollows, and all nail heads shall be set.

8. BUILDING PAPER

Before laying copper all surfaces shall be covered with building paper or roofing felt of approved quality, weighing not less than 6 pounds per 100 square feet (i.e. 30 pounds per standard roll of 500 square feet). Paper shall lap 2 inches and be nailed with large flat-head copper nails.

9. SHEATHING (CARPENTERS' SPECIFICATION)

All sheathing upon which sheet copper is to be laid shall be of straight, unwarped boards, free from splits and knot holes. All joints shall be true and even. All nail heads shall be set. All uneven edges of boards shall be smoothed off to give a firm, even surface.

Notice shall be given to the roofing contractor when the sheathing is laid and an inspection shall be made by him. All defects observed at this inspection shall be corrected promptly.

10. WOOD SHEATHING

All wood sheathing shall be absolutely dry and sound when copper is applied. The lumber shall be (A) kiln-dried; (B) air-dried.

11. CONCRETE (MASONS' SPECIFICATION)

All concrete surfaces to be covered with copper shall be made smooth and even with a wash of neat cement. Where cinders have been used in the concrete it shall be painted with two heavy coats of asphalt paint.

Where required, provision shall be made for securing copper work by means of (1) nailing into (A) nailing concrete; (B) embedded wooden battens or (2) expansion bolts.

12. GYPSUM (MANUFACTURERS' SPECIFICATIONS)

Gypsum surfaces to receive sheet copper shall be well-laid, smooth and even. Where nailing is required the gypsum shall be provided of sufficient thickness to allow a 2-inch penetration of copper alloy nails.

13. MISCELLANEOUS LAYING SURFACES (MANUFACTURERS' OR MASONS' SPECIFICATION)

Where copper is to be laid on or against terra-cotta, stone, brick or stucco the surfaces shall be made smooth and even with a wash of neat cement or two coats of heavy asphalt paint. Required provision shall be made for proper fastening.

14. SOFT (ROOFING TEMPER) COPPER. HARD (COR-NICE TEMPER) COPPER

Except as otherwise specified, all copper throughout the work shall be of 16-oz., soft (roofing temper) copper sheets.

All leaders, eaves troughs, molded hanging gutters, and other formed parts as specified, shall be of 16-oz., hard (cornice temper) copper.



15. LEAD-COATED COPPER

Except as otherwise specified all lead-coated copper shall consist of 16-oz. soft (roofing temper) Revere Leadtex. The exact weight, texture, and tone of the lead coating on each side of the sheet shall be as specified by the architect, in accordance with Specification B-101 of the American Society of Testing Materials.

16. CRIMPED COPPER

Where specified copper sheets shall be used which have been crimped by passage through heavy rolls to form ridges about $\frac{3}{8}$ -inch center to center in the direction of the short dimension.

17. CORRUGATED COPPER

Where called for on the drawings corrugated copper of the form and gage specified shall be used. The form and size of the corrugations shall be clearly and completely defined by means of dimensions.

18. SOLDER

All solder shall be of the best grade, equal to Specification B-32 of the American Society for Testing Materials, and shall be composed of one-half pig lead and one-half block tin (new metals).

19. FLUX

Rosin shall be used as a flux.

In exceptional cases where acid flux must be used it shall be thoroughly "killed" with zinc before being applied to the copper. After soldering with acid flux the entire work shall be thoroughly washed with a solution of soap and 5% to 10% washing soda.

20. TINNING

The edges of all sheets to be soldered shall be tinned $1\frac{1}{2}$ " on both sides with pure tin or solder. Rosin shall be used as a flux.

21. SEAMS

Standing seams shall finish not less than 1" high unless particularly specified otherwise.

Flat-lock seams shall finish not less than $\frac{1}{2}$ " wide.

Lap seams where soldered and subject to stress, shall finish not less than 1" wide.

Lap seams, where soldered and not subject to stress, shall finish not less than $\frac{1}{2}$ " wide.

Lap seams not soldered shall lap according to the pitch but not less than 3".

Double or copper-lock seams shall finish not less than $\frac{1}{2}$ " wide.

All flat and lap seams shall be made in the direction of the flow.

22. LOOSE-LOCK SEAMS

Loose-lock seams shall be provided as specified and shall be so formed and located as to preclude leakage.

23. EXPOSED EDGES

The exposed edges of all flashings shall be doubled back $\frac{1}{2}$ " in such manner as to conceal them from view and to provide stiffness.

24. EXPANSION JOINTS

Expansion joints of the size and type indicated shall be provided as called for in the drawings.

Such joints shall be placed:

(-1) Every 25' to 50' in continuous copper lined gutters, cornices, etc.

(-2) In conjunction with building expansion joints.

25. WHITE LEAD

Where specified seams shall be caulked with white lead paste made up of basic lead carbonate, conforming to specification D81-34 of the American Society for Testing Materials, and boiled linseed oil. The oil shall make up 8% of the paste which shall be smooth, free from lumps, and of a putty-like consistency.

26. NAILS AND FASTENINGS

All nails, rivets, screws and similar fastenings shall be of best grade hard copper or copper alloy.

Nails for wood sheathing and nailing concrete shall be wire nails not less than No. 12 gage and not less than $\frac{3}{8}$ " long.

Nails for precast or poured gypsum shall be not less than No. 9 gage and not less than 2" long.

27. CLEATING AND FASTENING

All sheets over 12" wide shall be fastened by cleats 2" wide and about 3" long, spaced as specified elsewhere. They shall be secured to the roof by two nails set about $\frac{3}{4}$ " from the end and shall have the end turned back $\frac{1}{2}$ " over the nail heads. The free end of the cleat shall be turned over to engage the edge of the sheet and shall be locked into the seam. Where seams are soldered cleats shall be tinned. Except as otherwise specified cleats shall be spaced not more than 12" apart.

Sheets less than 12" wide shall be secured by nails spaced as specified for different types of flashings.

Where flashings are nailed the nailing shall be restricted to one edge only. Nails shall be near the edge and shall be evenly spaced not more than 4" apart, unless otherwise specified.

Where copper is laid on concrete or gypsum roof slabs the roofing contractor shall prepare detailed instructions, with drawings, etc., for locating all fastenings for cleats, edge- and eaves-strips, flashings, etc.

28. FASTENINGS FOR COPPER ROOFING (MASON'S SPECIFICATION)

In all concrete or gypsum roof slabs which are to be covered with copper roofing or flashing, set fastenings for cleats, edge- and eaves-strips, etc., as located by the sheet-metal contractor. Fastenings shall consist of (1) 2" x 2" nailing strips placed in the roof slab flush with surface; (2) wood grounds placed in the roof slab at eaves, etc.; (3) expansion inserts to receive nails or screws.

Before the roof slabs are poured this contractor shall obtain from the sheet-metal contractor complete instructions, with drawings, for locating fastenings.

29. RIBBED (BATTEN) SEAM ROOFING

Wood or copper alloy ribs of the shape and dimensions indicated shall be set under another contract to the spacing shown on the drawings. The roofing contractor shall see that these are well secured with all nails well set, bolts or nuts countersunk, truly lined and evenly spaced, and shall not proceed until all faults have been corrected.

In general sheets shall be 96" long and shall be laid with cross seams staggered. They shall be fastened by cleats not over 12" apart and secured to sides of wood ribs. The cleats shall be locked to the sheets and the ribs shall be covered with a flashing cap locked over the cleats and edges of sheets on both sides.

All cross seams shall be flat-lock, and (1) unsoldered; (2) filled with white lead; (3) thoroughly sweated with solder, as specified under "Soldering." They shall be secured by cleats.

30. BATTENS OR RIBS FOR COPPER ROOFING (CARPENTERS' SPECIFICATION)

Where indicated on the drawings place on the roof sheathing wood battens or ribs shaped as detailed. The spacing of these ribs is approximately . . . inches. The exact spacing shall be determined by the architect, and this contractor shall use a templet or gage-board to insure proper lining and spacing. They shall be firmly nailed with all nail heads set.

31. STANDING SEAM ROOFING

Seams shall be spaced as shown on the drawings.

All sheets shall be, in general, full length. They shall be laid with long edges turned up to form standing seams, and shall be secured by cleats not over 12" apart. No solder shall be used on standing seams. Cross seams shall be staggered.

All cross seams shall be flat-locked, and shall be, as indicated on drawings, (1) unsoldered, (2) filled with white lead; (3) soldered as specified under "Soldering." They shall be secured by cleats.

32. FLAT SEAM ROOFING

The roofing shall be applied the narrow way, joints staggered, using sheets not larger than 14" x 20".

All sheets shall be properly clipped and bent to form flat seams. Each sheet shall be secured to the roof with 2" x 3" copper cleats evenly distributed along the edges of each sheet, two on the long side, one on the short.

(-1) All sheets to be soldered shall be tinned all around and on both sides twice the width of the lock seam to be used.

(-2) Where white lead is used in the seams tinning shall be omitted.

33. CORRUGATED COPPER ROOFING AND SIDING

Corrugated copper sheets shall have a side lap of at least one corrugation for siding and $1\frac{1}{2}$ or 2 corrugations for roofing. End laps of sheets shall be at least 3" for siding and 6" for roofing.

All fastenings shall be of copper or copper alloy, and for roofing sheets they shall be applied through the high points of the corrugations.

When laid on steel purlins, the steel shall be insulated from the copper sheets by (A) asbestos strips, (B) lead strips or washers, (C) heavy asphalt paint over steel, (D) heavy tinning of steel.

34. SIZE OF SHEETS

(-1) Strip copper shall be used for all flashings up to 18" in width.

(-2) In general, flashings for flat surfaces such as decks, crickets, etc., shall be of sheets not larger than 14" x 20". Under special conditions larger sheets may be used with the architect's approval.

(-3) All built-up and lined gutters shall be flashed with sheets of size specified under "Built-in Gutters." (See paragraph 51.)

35. BASE FLASHINGS

(-1) Unless otherwise specified or shown on the drawings, base flash-

ings shall be, in general, at least 6" high, and shall project at least 4" out on the roof. On sloping roofs they shall lap longitudinally at least 3". On flat roofs the joints shall be flat-locked and soldered.

(-2) Against stucco-coated walls, the metal lath shall lap outside the flashing so that the stucco shall finish over the flashing.

36. CAP FLASHINGS OR COUNTER-FLASHINGS

Cap flashings shall turn down over base flashings not less than 4", and shall have bottom edges turned back 1/2". They shall be secured to vertical surfaces as follows:

(-1) WOOD WORK. They shall extend up under exterior coverings such as shingles, slate, etc., at least 2" above the butt of the second course, and in no case less than 4" above the roof.

(-2) MASONRY WORK. For Thru-Wall Flashing see specifications given on page 41 of this catalog.

(-3) REGLETS. They shall be secured, as specified below, in reglets cut in the masonry.

(-4) STUCCO ON WOOD. When used with stucco-covered wood-frame walls, cap flashings shall be formed over a 7/8" base board and extend up the wall at least 2" above the base board, and be nailed at the top edge with nails about 8" apart. Metal lath shall be placed over the flashing and the stucco shall be finished against the base board.

(-5) STUCCO ON MASONRY. They shall be built into the masonry as the work progresses and shall project out from the wall as required and turn down over the base flashing. The stucco shall finish against the cap flashing.

(-6) CONCRETE WALLS. They shall be set in the forms before the concrete is poured. They shall extend into the wall at least 2" and shall have the inner edges turned back 1/2".

37. FLASHINGS FOR CLAY AND CEMENT ROOF TILE

Flashings shall be laid as specified elsewhere for base, cap, and continuous flashings. All base flashings running with the length of the tile shall extend out on the roof under the tile as far as possible without puncture by nails, and shall be formed into a trough by turning up the edge 90°. So far as possible flashings shall be laid to avoid sharp bends and angles, and shall not be nailed. They shall be held in place by the weight of the tile or by cleats. The manufacturer's specifications shall be followed for flashings of special shapes, etc.

Where vent-pipes occur the tiles broken by the pipes shall be bedded in mortar or secured with nails and covered with the flashing. Flashings shall extend down the roof to the end of the tile, out on the sides to the first lock or trough, and up the roof to and over the wood battens or to the nails securing the tiles.

Valley flashings shall be formed to fit the type of tile used and shall extend up the sides of the intersecting slopes, or be turned over the supporting wood battens, to form a valley at least 4" deep.

Flashings against the sides of dormers, etc., on sloping roofs shall continue as a trough under the tile and discharge out on top of the tile below or into the gutter.

Exposed flashings shall extend with the length of the tiles at least 6" and shall be formed over them. Those extending crosswise shall terminate in depressions or locks and be held in place by the adjoining tiles or by cleats.

38. FLASHINGS FOR BUILT-UP ROOFING (ROOFERS' SPECIFICATION)

When used with built-up roofing base flashings shall be not less than 5" high and extend at least 6" out on the roof, in accordance with Specification No. 156 of the Federal Specification Board for the Installation of Metal Flashings with Bituminous Built-up Roofings.

Cap-flashings shall be installed by the Sheet-Metal Contractor as specified elsewhere. The Roofing Contractor shall read carefully the sheet-metal specifications.

39. FLASHINGS FOR TERRA-COTTA

Where indicated on the drawings terra-cotta shall be flashed to make a water-tight job. The top surfaces of all projections such as the washes of cornices, where the wash is formed of more than one piece, shall be completely flashed, and where so shown on the drawing all deck projections shall be so flashed.

Flashings shall be secured to the outer edge of terra-cotta projections by forming around a rolled nosing or bull-nose formed in the terra-cotta, or by brass screws set with lead sleeves into holes formed in the terra-cotta. The screws shall be set through washers and shall be soldered to the sheet. The sheet so secured shall extend down below the edge of the terra-cotta not more than 3/8" to form a drip.

Cornices, band cornices, gutters, etc., formed in terra-cotta, or masonry faced with terra-cotta, shall have a continuous flashing running from the outside edge up to and behind the cap flashings.

Cap flashings shall be built in behind the terra-cotta facing above all cornices, etc. They shall extend up the wall at least 3" and shall lap the cornice flashing 4".

Balconies with balustrades shall have continuous flashings running from under the door or window sills through the balustrades and to the outside edge of the projection. Flashings shall be formed with flat-locked or lapped seams well soldered. Large areas shall be covered as in flat seam roofing.

Around column bases, etc., flashings shall be turned up and into a reglet formed in the terra-cotta, or into the first joint of the terra-cotta facing in such a manner as to make a water-stop.

Where rods, etc., necessary to support terra-cotta balustrades or other architectural members, penetrate the flashings, the joint shall be made watertight as follows: The rods being in place, the flashing pieces shall be marked, punctured and set in position by sliding down over the rods; or, if this method is impracticable, the sheet may be slit to allow them to be slid into place. The slit shall be made tight by soldering a strip over it. Cups or thimbles, conforming roughly to the shape of the rod or bar then shall be placed over the rods and soldered to the sheet. They shall be at least 1" larger all around than the rods. The cups shall then be filled with mortar or an approved waterproofing-compound.

40. TERRA-COTTA (MANUFACTURERS' SPECIFICATION)

(-A) *Edges of all top pieces of projections to be flashed shall have formed on the vertical face holes about 9" apart, 3/8" in diameter, and at least 3/4" deep, for fastening the flashings.*

(-B) *All edges to receive flashings shall have a rounded nosing around which the flashing sheet may be hooked and held firmly.*

Where indicated on the drawings or directed by the architect, holes shall be formed in the terra-cotta for securing flashing cleats. They shall be spaced about 12" apart.

41. HIPS AND RIDGE FLASHINGS

(-1) Install hip and ridge flashings over roofing or battens set by other contractors. They shall be secured on either side of the roll by round-head brass wood-screws about 12" apart, set through washers. Holes in the roof covering shall be drilled. The heads of the screws and washers shall be covered with copper caps soldered to the flashing.

(-2) Hip and ridge rolls of design shown shall be installed over battens, etc., set by other contractors. The apron shall be held down by 1/8" x 1" brass bands 30" apart, secured to the batten by brass wood screws through countersunk holes.

42. OPEN VALLEY FLASHINGS

(-1) Open valleys shall be not less than 4" wide. The proper width shall be determined by the following rule: Starting at the top with a width of 4", increase the width 1" for every 8' of length of valley. Flashing pieces shall be full length sheets, and of sufficient width to cover the open portion of the valley and extend up under the roof covering not less than 4" on each side. The sheets shall not be punctured with nails.

There shall be no longitudinal seams in open valley flashings. The cross seams at the ends of sheets shall be lapped according to the pitch or locked and soldered. Edges shall be turned back 1/2" and held in place by cleats spaced not more than 12" apart and nailed to the sheathing with two copper or copper alloy nails.

(-2) "FOLD-OVER" FLASHINGS shall be used, of such design as to allow not less than 3" beyond the fold to be covered by the roofing. They shall be secured by cleats not more than 12" apart.

(-3) Where two valleys of unequal size come together, or where the areas drained by the valley are unequal, there shall be placed in the valley a "crimp" angle, or Tee not less than 1" high. This may be formed in the valley sheet before placing, or it may be made of a separate piece soldered to the valley sheet.

43. CLOSED VALLEY FLASHINGS

(-1) BUILT-IN METHOD. Flashing pieces for closed valleys shall be of sufficient length to extend to or above the top of the roofing piece and lap the flashing piece below 3", and of width sufficient to extend up the sides of the valley far enough to make the valley 4" deep. They shall be placed with the roofing so that all pieces are separated by a course of shingles or slate. Pieces shall be set so as to lap at least 3" and to be concealed entirely by the roof covering. They shall be fastened by nails at the top edge only, or hooked over the top of the underlying shingles.

(-2) LARGE PIECE METHOD. Before the roof covering is laid this contractor shall place in all valleys long strips of copper of sufficient width to make a trough at least 4" deep. These strips shall be laid from bottom to top of the valley with a 4" lap, unsoldered. Where such strips are not over 12" wide they shall be fastened with nails spaced every 18" along the outer edge. Strips over 12" wide shall be fastened by 2" cleats, spaced every 30".

(-3) All closed valley flashings shall be made with a "crimp" or ridge down the center equal to the full thickness of the roof-covering courses.

44. CHANGES OF SLOPE

All changes of slope in shingle roofs shall be flashed with copper.

(-1) EXPOSED FLASHINGS. On the upper slope the flashing shall ex-



tend as far as possible without being punctured by nails, and cleated, and on the lower slope it shall extend at least 3" over the shingles.

(-2) **CONCEALED FLASHINGS.** On the upper slope the construction shall be the same as for exposed flashings. On the lower slope the flashing sheet shall be carried down between the shingles of the double course to within 1/2" of the butts. These shingles shall be fastened with countersunk brass screws passing through lead washers over the flashing.

45. FINISHES AT WALLS

All joints between roofing and walls shall be flashed with copper, and unless otherwise specified flashings shall be cap and base, or through wall flashings.

SHINGLE ROOFS. Flashing shall be by means of cap and base, or through wall flashings as specified elsewhere, or a concealed flashing. The concealed flashing shall be in one piece forming a concealed gutter at least 3" wide and carried under the roofing at least 4". It shall be secured to the wall as specified for cap flashings.

TILE ROOFS. Flashings shall be as specified elsewhere.

COMPOSITION ROOFS. Flashings for composition or laminated roofs shall be as specified elsewhere for Built-up roofing.

46. WALL FLASHINGS

Where called for in the specifications or shown on drawings, wall flashings shall be "through" flashings installed so as to provide complete cut-off for moisture and seepage. They shall be of the type and design determined by the architect, and if a patented kind is called for they shall be installed according to the manufacturer's specifications.

All walls having copings shall be (1) covered with copper; (2) through-flashed with copper. Where dowels are used, they shall penetrate the flashing and be rendered water-tight as specified elsewhere.

47. FLASHINGS BETWEEN OLD AND NEW WORK

Where new work is to be flashed against old work, such as at the junction between an old and a new building, the flashing shall be such as to allow for settlement.

(-1) Where the new wall is higher, the top of the old wall shall be covered with a flashing cap, extending completely over it and placed before the new wall is brought up. The old work shall then be flashed and counterflashed to the new, the base flashing being turned down over the old wall and locked to the cap, and the counter-flashing being built in with the new work as specified elsewhere.

(-2) Where the new wall is lower than an old wall, a flashing cap shall be placed over the new wall and turned down on both sides. The joint shall then be flashed and counter-flashed, the base flashing extending down over the new wall and locking to the cap. The counter-flashing shall be set in a reglet cut for it in the old wall and caulked with lead wool.

(-3) When the walls are level, the flashing shall consist of a cap continuous over both walls, properly sloped to shed water, and secured by brass wood-screws to the underside of a two-piece wood blocking secured on top of the walls by others. The flashing shall be in two pieces joined by a standing seam, or a loose-locked seam placed on one vertical side of the blocking so as to prevent leakage and to allow for settlement.

48. WATER-TABLE FLASHINGS

Water-table flashings shall extend up the sheathing at least 4".

(-1) It shall be formed over the edge of the water-table to make a drip and shall be secured at the upper edge by nails 4" apart.

(-2) If the edge-strip method of fastening is used the upper edge shall be nailed about every 8".

49. DRIPS AND EDGE-STRIPS

(1) Where indicated on the drawings, flashings shall be secured by brass edge-strips, 1/8" thick by 1 1/4" wide. Strips shall be fastened to the vertical face of the projection by brass screws about 12" apart, and set to allow the copper flashing to be hooked over the lower edge at least 3/8".

(2) Where indicated on the drawings, form drips of hard (cornice temper) copper strips. These shall be nailed to the projection and shall project not more than 3/8" below the sheathing or the upper fillet of the molding, and shall have the flashing hooked over the lower edge at least 3/8".

50. EAVES TROUGH AND HANGERS

Eaves trough, or half-round hanging gutters, of the size and type shown, shall be installed where shown on the drawings. They shall be in 10' lengths and shall be joined by a 1" lapped and soldered joint, or by slip joints.

All joints shall be made in the direction of the flow.

Eaves trough shall be provided with end pieces, end caps, outlet tubes and mitres as required.

Eaves trough shall be supported by (1) wrought copper strap hangers of approved design; or (2) bronze or copper shank-and-circle-type hangers.

(-1) Wrought strap hangers shall be spaced not more than 36" apart and shall be secured to the roofing by brass screws.

(-2) Shank-and-circle type hangers shall be adjustable for slope and shall be spaced not more than 36" apart. They shall be secured by brass screws.

51. BUILT-IN GUTTER LININGS

Where indicated on the drawings, line all box or built-in gutters with copper. Gutter-linings shall fit loosely and shall have the back edge 2" higher than the front edge. Back edges of linings shall lock to copper roof covering and when used with slate, tile or shingles shall lock to flashing extending up the roof as far as possible without being punctured by the nailing of the roof covering, and secured with cleats.

(1) Small sheets shall be laid with seams staggered. All seams shall be flat-locked and soldered. Sheets shall be secured by cleats, and shall be 14" x 20".

(2) Large sheets used to form gutter-linings shall be laid the long way of the gutter. The ends of the sheets shall be flat-locked and soldered but left uncled to form a continuous "floating" unit.

All gutter-linings over 24" wide shall have a longitudinal flat-lock seam running the length of the gutter, soldered and secured by cleats.

Linings shall be connected to flashings or to copper roofing by means of large loose-locked seams, folded flat and so placed as to avoid any possibility of leakage. In general the connection shall be made as close to the intersection of the roof slope and the inside of the gutter as is possible.

The back edge of all gutter-linings finishing against vertical walls shall be carried 4" above the outside edge and shall be covered by cap flashings built into the wall.

(-1) Gutter-linings in wood cornices shall have the front edges turned under the lower edge of a 1/8" by 1 1/4" brass strip screwed to the vertical face of the top member of the cornice. This strip shall be so placed as to form a proper drip.

(-2) Gutter-linings set in stone cornices shall be placed over a wood sheathing or nailing concrete forming the gutter slope. Outer edges shall be locked into a strip secured in a reglet. Where the wash-slope slopes out and the width of outer sheets of the lining exceeds 20", a standing seam shall be formed at the reglet.

(-3) Gutter-linings in concrete or brick work shall be secured to batten nailing strips or nailing concrete, set by other contractors according to directions by this contractor.

(-4) Gutter-linings formed back of copper cornices shall have the front locked to the top edge of the cornice.

(-5) For expansion joint see Specification 24.

52. BUILT-IN GUTTERS (MASONS' SPECIFICATION)

Cut all reglets for gutter-linings as shown on plans or directed by the architect. Set all battens and nailing strips in masonry necessary for the sheet metal work.

Form all depressions in masonry for outlet boxes as shown on the plans.

Form slopes to outlets in gutters and back of projections which are flashed.

All concrete surfaces to be covered with flashing shall be washed smooth with neat cement. Where cinders have been used in the concrete it shall be painted with two heavy coatings of asphalt paint.

Provide nailing concrete where called for in the drawings, with a smooth and even surface and of required depth.

Consult with the sheet-metal contractor on all details in connection with his work.

53. EXPANSION JOINTS

(-1) **ROOFS.** Where expansion joints in the roof are shown on the drawings, these shall be formed or flashed with copper. Joints shall be provided in cornices, gutters, roofs, and walls to correspond to all building expansion joints called for to allow for the movement of the building.

(-2) **GUTTERS.** Where called for on the drawings provide expansion joints at high points, the full height of the gutters. The lining of the gutters shall be turned up and folded back to form flanges over which a cap shall be placed to form a water-tight joint. There shall be sufficient play between the cap and the flanges to allow for the full movement of the gutter and the building. The cap shall have soldered on its outer edge a V-shaped curb to turn water from the roof into the gutter.

54. REGLETS

Where indicated on the drawings or where directed by the architect flashings shall finish in reglets in the masonry cut by others where located by this contractor.

A flashing strip shall be turned into the reglet the full depth and shall be turned back to form a hook.

After the strip is in place in the reglet it shall be secured in place by

plugs at about 12" spacing, using molten lead on flat surfaces, and lead wool on vertical surfaces.

After caulking, the reglet shall be made smooth by filling with elastic cement.

55. REGLETS (MASONS' SPECIFICATION)

Where indicated on the drawings or where directed by the architect cut reglets in the masonry as located by sheet-metal contractor for the insertion of flashings.

Reglets shall be 1/2" wide at the top, 3/4" wide at the bottom, and 1" deep. They shall be cut with true and straight edges, with sides and bottom roughened.

56. FLASHINGS FOR CORNICES

All masonry cornices, band-courses projecting more than 12", balconies, balustrades, etc., shall be flashed with copper. Flashings shall be secured on the outer edge by reglets. The back edge shall be continuous at least 3" above the outer edge and in no case less than 4" high. Where stone facing on brick backing is used, cap flashings shall be set in and shall cover the base flashings.

Where stone balustrades occur on top of a cornice, etc., flashings shall be set in reglets under the balusters, or shall be continuous through the balustrade and either turn down over the interior roof base flashings as a cap flashing, or be connected thereto by a loose-locked joint. Dowels for fastening balustrade members together shall penetrate the flashing and shall be covered with a copper cap or thimble soldered to the flashing.

Flashings over 24" wide shall have a full-length longitudinal seam secured by cleats, and shall have a standing seam at the reglet.

57. OUTLETS FOR BUILT-IN GUTTERS

Outlets shall be formed as shown on the drawings. The gutter lining shall be turned into them and secured by soldered lap seams.

Holes shall be cut as soon as the lining is placed and temporary spouts shall be put in until the permanent drainage is ready.

Outlets shall be connected to leaders by

- (-A) a 20-oz. copper tube;
- (-B) a seamless copper tube.

Connections shall be flanged at the top and soldered to the outlet-box lining; the bottom shall have soldered to it a brass ferrule or caulking ring furnished by the plumbing contractor.

58. ROOF-DRAINS

(-1) Approved types of patented roof drains may be used. They shall be furnished and set by the plumbing contractor and connection shall be made to them by the sheet-metal contractor in strict accordance with the manufacturer's directions.

(-2) Roof drains shall consist of a circular or square pan whose diameter or side shall measure at least 4" greater than the outlet, and have a depression of not less than 1 1/2". They shall have a flashing extending out on roof surfaces, on all sides of the pan, not less than 6". The flashing or pan shall be provided with a rib forming a gravel-stop or of proper height to receive (1) built-up (2) promenade-tile roofing.

(-3) Roof drains shall consist of a copper flange extending out on the roof on all sides a distance at least equal to the size of the outlet. The flange shall be provided with a rib or gravel-stop against which to finish (1) built-up (2) promenade-tile roofing.

59. OUTLETS FROM DRAINS

Outlets from Drains shall consist of:

(-1) a 20-oz. copper tube, soldered to the (A) pan; (B) flange, and (1) extending into the drain pipe at least 6" with the outside coated with asphaltum; (2) with a brass ferrule or caulking ring soldered to the end of connection to the drain pipe by the plumbing contractor.

(-2) a seamless copper tube, flanged at the top and soldered to the (A) pan; (B) flange. Connections to the drain pipe shall be made by the plumbing contractor.

60. ROOF DRAINS AND GUTTER OUTLETS (PLUMBERS' SPECIFICATION)

(-1) *Furnish the sheet-metal contractor all brass ferrules necessary for connecting the drainage system and the roof drains and outlets shown on the plans, and connect copper tubes fitted with these ferrules to the drain pipes by caulked and leaded joints.*

(-2) *Furnish and install complete with all piping connections the patent drains shown on the plans. Make provision, where necessary, for the work of other trades in connecting to the drains.*

(-3) *Where shown on the plans furnish and install a seamless copper tube of a length necessary for the sheet-metal contractor to make a proper connection to the outlet-box or roof drain, and with a brass ferrule or caulking ring for connecting to the drain pipe.*

61. STRAINERS

(-A) All outlets from gutters and roofs shall be provided with heavy,

cast brass, removable strainers the full size of the outlet-box.

(-B) All gutter outlets shall be fitted with approved copper wire strainers of the basket type set in loosely.

62. SCUPPERS

Flash all scuppers with copper, making same a part of the roof flashing. Scupper flashings shall cover the interior completely and shall extend through and project outside of the wall. Seams shall be locked, or lapped, and soldered. Scupper flashings shall be joined to roof flashings by soldered seams.

63. SCUPPERS (CARPENTERS' OR MASONS' SPECIFICATION)

All enclosed roof surfaces, including balconies, etc., shall be provided with scuppers or auxiliary drains. The bottom of scuppers shall be not more than 2" above the finished roof surface at the lowest point.

64. AUXILIARY DRAINS

Auxiliary drains shall be so constructed that their outlets are separate from the main outlets and shall be at least 3" above the main outlets. They may be connected to the main drain by means of a Y branch.

65. CURBS

Curbs around roof openings shall have a flashing turned down on the inside about 3" and secured with nails 1 1/2" apart. It shall extend out on the roof as specified for base flashings.

66. CRICKET OR SADDLE FLASHINGS

Crickets or saddles formed back of all vertical surfaces, such as chimneys, etc., breaking through sloping roofs, shall be covered with copper. The flashing of these crickets shall be made a part of the flashing along the sides of the chimney, etc.

67. VENT FLASHINGS

All pipes passing through roofs shall be flashed and counter-flashed. Base flashings shall extend out on the roof not less than 6".

(-1) They shall be of sufficient length to cover the roofing course next below the pipe and to extend up under the roofing course above as far as possible without puncture by nails.

(-2) Where vent-pipes extend more than 12" above the roof the counter-flashing shall be caulked into the hubs or held with brass clamps embedded in elastic cement or white lead. It shall lap the base flashing at least 4".

(-3) Where the vent extends not more than 12" above the roof surface, it shall be flashed as follows:

CAST IRON PIPE. The base flashing shall be carried up to within 1" of the top of the pipe and shall be counter-flashed by a copper cap 6" high, turned over and down into the pipe at least 2".

THREADED PIPE. The base flashing shall extend up to within 2" of the end of the pipe, which shall be threaded. After the flashing is in place the threads shall be covered with white lead and an iron or steel cap, of such design as to enclose the flashing material, shall be screwed onto the pipe.

(-4) Patented vent-flashing devices may be used, subject to the approval of the architect. They shall be made of 18-oz. copper, shall be the product of a recognized manufacturer, and shall be installed according to manufacturer's directions.

68. VENTILATOR FLASHINGS

Where metal ventilators are used on a roof they shall be connected to the flashing by a soldered lap seam. The flashing sheet shall extend out over the roofing on all sides at least 6".

(-1) On shingle or slate roofs the flashing shall be secured by round-head brass wood-screws set through holes drilled in the roof covering. The screws shall be set with slotted brass washers and shall be soldered to the flashing. The screws and screw holes shall be covered with soldered copper caps.

69. FLASHING AROUND STEEL STRUTS

Where steel struts, etc., penetrate a flat roof, a copper pan about 2" high above the finished roof level shall be formed around the member. It shall have a flange projecting out on top of the roofing at least 2". This flange shall be soldered to the copper roofing, or with built-up roofing shall be covered with two layers of felt carried out on the roofing not less than 6" and well-mopped with pitch. The pan so formed shall be filled with pitch, and the top surface sloped to drain freely.

On sloping roofs the procedure shall be the same except that the sides of the pan shall be so proportioned as to retain the pitch.

70. FLAG POLE FLASHINGS

(-A) Flag poles penetrating a flat roof shall have a circular base flashing extending up the pole at least 10" and 1" larger in diameter than the pole. It shall be turned out at the top to cut off drifting snow. A conical hood secured to the pole by a 1" brass band set in white lead



and bolted, shall lap the base flashing at least 3". The whole flashing shall be so constructed as to allow for the movement of the pole.

(-B) Patented flashing-flanges or similar devices for flashing flag poles shall be used subject to the approval of the architect. They shall be the product of a recognized manufacturer and shall have a flashing of 18-oz. copper. They shall be installed in accordance with the manufacturer's directions.

71. WINDOW AND DOOR HEAD FLASHINGS

Window and door frames set in frame construction shall have a flashing of copper over the head. This flashing shall be set after the frame is placed and shall be carried up the wall 2" above the butt of the second course of shingles, slate, etc., and in no case less than 3" above the window head. The bottom edge of the flashing shall be

(-A) secured to the trim by an edge-strip as specified elsewhere.

(-B) turned down over the trim and shall finish back of, and be secured by, the outside molding of the trim.

(-C) nailed at 1" intervals to the vertical face of the trim.

(-D) bent at a sharp angle to bear tightly against the top fillet of the molding, and the upper edge of the flashing, under the shingles, shall be secured by nails placed about 8" apart.

72. WINDOW AND DOOR SILL FLASHINGS

(-1) Sill flashings for window frames in frame construction shall be set before the frame is placed. They shall extend to the back of the window sill and shall be nailed after the frame is set, and shall also extend out to the face wall.

(-2) Wood sills set in stone or concrete shall have a strip of 20-oz. or heavier hard (cornice temper) copper or a bronze bar at the joint. Just before setting the wood sill the reglet shall be filled with waterproofing-compound and the strip shall be embedded in it.

73. WINDOW AND DOOR SILL FLASHINGS (CARPENTERS' AND MASONS' SPECIFICATIONS)

The sills of wood frames set in stone or concrete shall have a slot 1" deep to receive a copper or bronze flashing strip. Stone or concrete sills under wood window or door frames shall have a 1" x 1" reglet cut or cast in them to receive a copper or bronze flashing strip.

74. GRAVEL-STOPS

Gravel-stops shall be placed at the edges of all built-up roofs covered with slag or gravel. They shall be formed of one piece of copper to provide a ridge the full height of the roofing material at the outer edge. They shall project on the roof at least 4", and be nailed on top of the waterproofing fabric, embedded in pitch, and covered with two layers of felt well-mopped with pitch.

75. COLUMN-CAP FLASHINGS

The upper surfaces of all exposed column caps shall be flashed. The flashing shall be formed to fit the cap and shall be turned down 1/2" over the edge of the cap and fastened. A separate piece shall be fitted over the dowel and soldered to the main flashing.

76. COLUMN-BASE FLASHINGS

Bases of wood columns on a roof shall be flashed by a cap made to fit the dowel used to secure the column. The cap shall have a flange extending out on the roof on all sides the necessary distance to provide for water-proofing, as specified elsewhere for different kinds of roofing materials.

77. SCUTTLES

Covers of roof scuttles shall be covered with copper. Sheets shall be laid with flat seams soldered, and shall be carried over the edge to the underside where they shall be secured with nails 1 1/2" apart.

78. SKYLIGHTS

Where shown on the drawings, build skylights of size indicated and of approved design and manufacture, with curbs at least 10" above the roof. All sheet metal shall be 16-oz. hard (cornice temper) copper, reinforced where necessary for strength and stiffness with steel sections. Copper and steel shall be insulated by coating the steel with asphalt paint, or by using lead-coated copper. All sash bars and bearings for glass shall have condensation gutters leading to the outside of the skylight. All skylights shall be made water- and weather-tight with joints interlocked, riveted and soldered and shall conform to the requirements of the National Board of Fire Underwriters. Duplicate sets of detail drawings shall be submitted for approval.

79. LOUVRES

Where shown on the drawings, louvres shall be formed of

(-A) copper,

(-B) wood covered with copper.

Duplicate sets of detail drawings shall be submitted for approval.

80. COPPER CORNICES

Where shown on the drawings, cornices shall be erected of 20-oz. hard (cornice temper) copper. They shall be made in strict accordance with the profiles shown on drawings with mouldings true, sharp and straight. All flat surfaces over 5" wide shall be crimped, all mitres and joints carefully fitted, angles and corners reinforced, and all joints neatly riveted and soldered together and made watertight. Cornice work shall be reinforced with properly-shaped steel brackets, separated from the copper by 3-lb. sheet lead.

The top edge shall be formed over a heavy brass or bronze edge-strip or drip properly shaped to permit the joining of the top flashing or gutter-lining as specified elsewhere.

Ornaments shall be stamped in soft (roofing temper) copper with dies made from approved models.

Duplicate sets of detail drawings shall be submitted for approval.

81. COPPER-COVERED WALLS

On vertical walls marked "Copper," such as bulkheads, skylight curbs, penthouse walls, etc., erect standing seam or paneled surfaces as indicated. All standing seam work shall be fastened to wall surfaces with cleats nailed with copper nails to wood sheathing, or furring strips. All paneled work shall have casings or strips to receive copper. Crimped sheets shall be used for all large panels and large areas of plain surfaces.

82. SAW-TOOTH ROOFS

Flashings for gutters in saw-tooth roof construction shall be carried up the sloping roof at least one foot beyond the "line of minimum-shadow" as indicated on the drawings, and shall be secured under the roof covering by cleats. Flashings shall be laid with flat seams, except on the vertical side where the flashings may be made with standing seams. Gutter-linings shall be made continuous and shall serve as base flashings for the window sill and side flashings.

Gutter-linings over 18" wide shall have a full length longitudinal flat-lock seam in the center of the gutter.

(Under carpenters' specification provide for snow racks of boards to prevent injury when gutters are cleared of snow.)

83. LEADERS, CONDUCTORS, OR DOWNSPOUTS

Leaders shall be installed where shown on the drawings, of the shapes and sizes indicated. They shall be held in position, clear of the wall, by

(-1) Brass hooks, driven into the wall not more than 6' apart.

(-2) Heavy brass or copper straps, 1/8" by 1 1/2", spaced not more than 6' apart, soldered to the leaders, and fastened (1) to wood work by brass screws; (2) to masonry by brass screws set in lead sleeves.

(-3) Ornamental straps of (1) stock design; (2) the design shown, and made of (1) hard (cornice temper); (2) soft (roofing temper) copper.

Leaders shall be in 10' lengths and shall have joints lapped. A 1 1/2" slip joint shall be provided every 20' of leader.

When leaders connect with underground drains they shall be fitted into drain-pipes and shall have the joint neatly cemented. All leaders not so connected shall have elbows at the bottom. Those discharging at ground level shall have heavy shoes with reinforced ends.

84. LEADER HEADS

Leader heads of (1) stock design; (2) the design shown, shall be placed where indicated on the drawings. Outlet tubes from gutters shall extend into them about 2". The leader head outlet shall extend at least 2" into the leader.

Large leader heads (12" wide or over) shall have a heavy copper-wire removable screening over the top.

85. SNOW-GUARDS (ROOFERS' SPECIFICATION)

(-1) Furnish and erect on sloping roofs approved copper wire snow-guards spaced not more than 13" apart in both directions and staggered.

(-2) Furnish and set at eaves a snow-stop consisting of three 1/2" bronze bars set in approved manner with bronze supports.

86. CLEANING COPPER

All copper work when finished shall be thoroughly cleaned of all flux, scraps and dirt. On large areas this shall be done as each section of the work is finished. Excess flux which may cause acid stains shall be neutralized by washing with a 5% to 10% solution of washing soda (or a solution of about one pound of lye in a pail of water.) After cleaning the copper shall be washed off with clear water.

87. PAINTING COPPER

Copper shall first be thoroughly cleaned, free from dirt and grease, and absolutely dry. If possible the copper shall be permitted to weather through several rainstorms until the surface takes on a slight tarnish from its oxidation by the atmosphere. Lead base paints shall be used for painting all copper work.



CHENEY FLASHING

WILL PROTECT YOUR CLIENTS' PROPERTY AGAINST

SEEPAGE AND LEAKS

Wherever any part of a masonry wall is directly exposed to rain and snow, water seeps into the wall; sometimes directly through the stone or brickwork, but invariably through the mortar joints. Penetrating downward it causes serious damage to both interiors and exteriors of buildings, even to the astral disintegration of the walls. Alternate freezing and thawing of wet walls in cold weather disrupts the masonry, entails expensive repairs and may even cause the parapet to fall into the street.

HAZARDS OF IMPROPER BOND

The hazard of falling copings and parapets, caused by insufficient bonding in the conventional types of thru-wall flashing, and the legal entanglements that ensue when walls fall from this cause, are too great to "take a chance"—and there have been many such failures in this country during the past few years. Cheney Flashing which bonds longitudinally, transversely and vertically eliminates this hazard.

It is highly improbable that the designers of the Empire State Building, New York, would have installed Cheney Flashing under the coping stones of the parapet at the 86th story, and without dowels, had they not been certain that Cheney Flashing formed a positive unbreakable key-bond—vertically as well as laterally with the masonry, and would retain this bond for the life of the building.

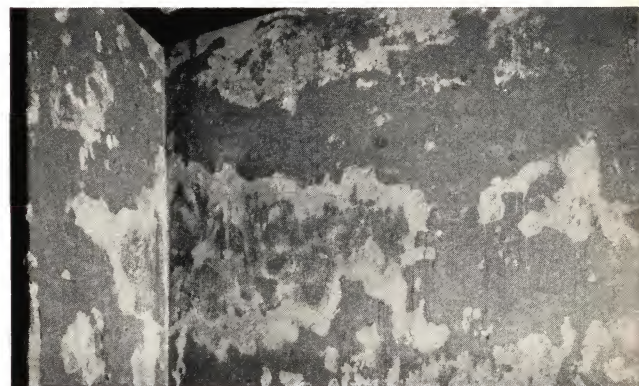
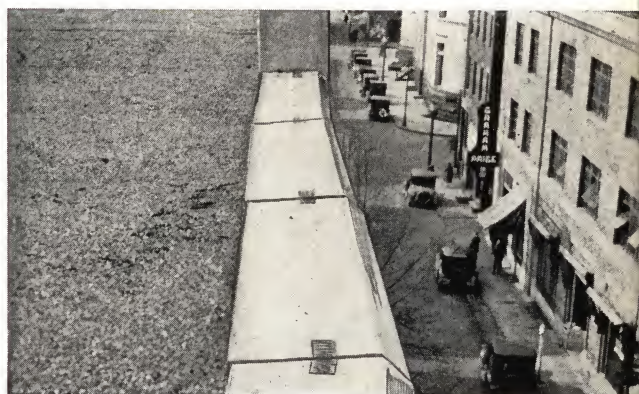
DEFACEMENT OF INTERIOR PLASTER

Damp interior walls and ceilings with paint and plaster constantly falling, are a menace to health, and an eyesore to owner and occupants, who insist upon the damage being repaired frequently.

Temporary repairs to masonry, plaster and paint are costly and fail to remedy the cause. It is the architect's responsibility to see that thru-wall flashing is properly selected and installed when the building is being erected.

EFFLORESCENCE

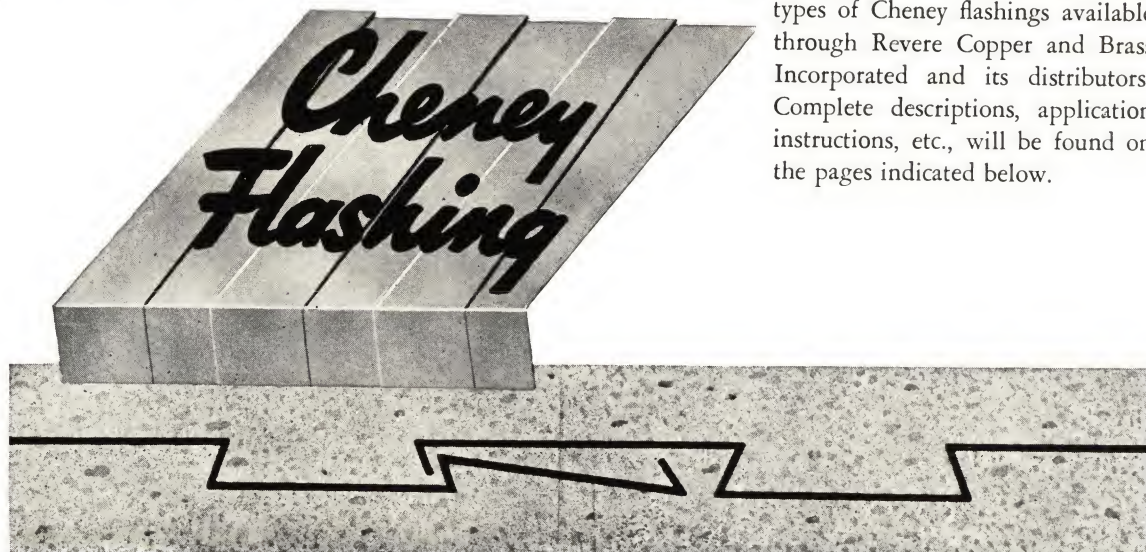
Efflorescence appears upon the exterior or masonry wall as a whitish deposit. It is caused by water seeping down through the wall and carrying with it the mineral salts in the mortar and brick to the wall surface, where the water evaporates leaving the unsightly whitish deposit. Efficient thru-wall flashing is the best way to safeguard against this condition.



CHENEY FLASHING TYPES

Cheney pioneered and introduced mechanically keyed Thru-Wall Copper Flashing to the architects and engineers of America. Millions of feet have been installed in most of the nation's fine buildings as well as in hospitals, colleges, libraries, apartment and office buildings and industrial plants. The following are the

types of Cheney flashings available through Revere Copper and Brass Incorporated and its distributors. Complete descriptions, application instructions, etc., will be found on the pages indicated below.



CHENEY FLASHING (16 oz.)

Cheney Flashing (16 oz.) is scientifically designed to provide perfect drainage with the positive key-bond in all directions—vertically, transversely and longitudinally. It positively prevents leaks and seepage and may safely be specified by the architect for the most exacting requirements. It is especially recommended for exposed work.

For description and application see page 35.

THREE-WAY FLASHING (10 oz.)

Three-Way Flashing (10 oz.) is identical in form to Cheney Flashing (16 oz.), the only difference being in the weight of copper used. It is especially recommended for concealed work where it can be recommended in preference to fabrics, plastics, wire mesh membranes, paper thin copper sheets covered with asphalt bitumens or building papers.

For description and application see page 38.

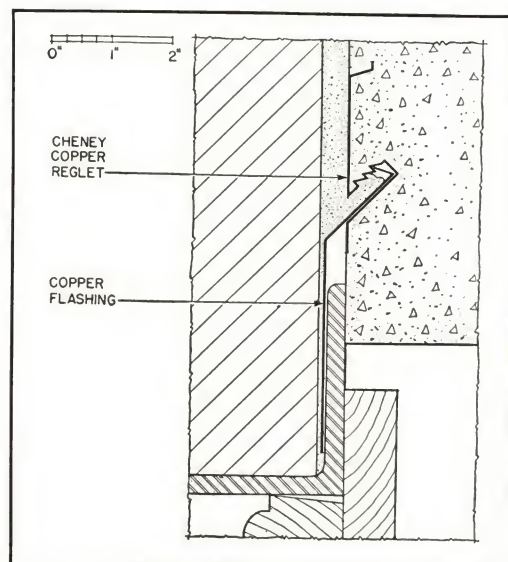
CHENEY SPANDREL WATERPROOFING

The Cheney System of Waterproofing is based on an entirely new principle. It involves two members; a reglet of 16 oz. copper, the upper surface of which is of saw-tooth design and a counterflashing of plain Revere Copper which is locked firmly into place. It offers very definite advantages over the usual membrane methods which disintegrate.

For description and application see page 39.

ALWAYS AVAILABLE

Stocks of Cheney Flashing are available through Revere sheet metal distributors throughout the United States. This important service eliminates costly delays.



Cheney Flashing has been designed to overcome the weakness of ordinary thru-wall flashings. The Key-bond construction of Cheney Flashing provides a "Factor of Safety" which includes two exclusive features that cannot be equalled by ordinary flashings; it bonds the masonry laterally and vertically in every direction, and in addition, its exclusive design provides numerous weep-holes that drain the walls quickly. The design of the flashing also takes care of expansion and contraction.

The keybond and drainage features are of the utmost importance in proper building construction.

The key bonding is especially important in the construction of high buildings where severe storms, high winds and the natural swaying of the buildings tend to loosen coping stones and parapets and hurl them below with a consequent loss of life or serious damage to people and property.

Flashings that bond only laterally, therefore, should not be specified or used for copings, parapets, cornices or other exposed areas with any confidence that they will provide safe or permanent protection.

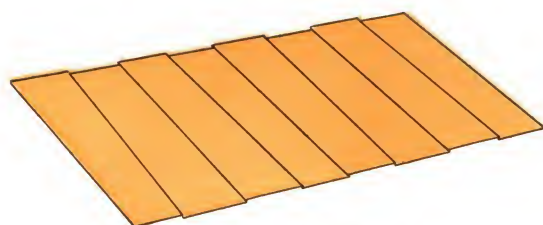
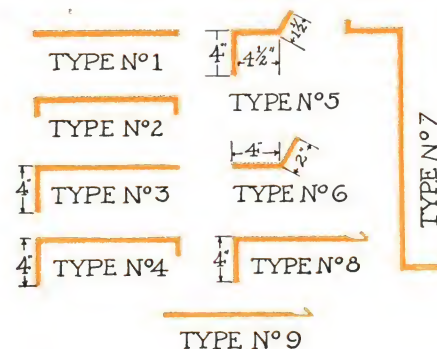
The self-draining feature is also particularly valuable, especially in cold weather when it is absolutely essential that water should drain from the walls quickly—before freezing. If permitted, alternate freezing and thawing soon breaks up the mortar joints, sometimes even the stonework itself, thus greatly weakening the wall.



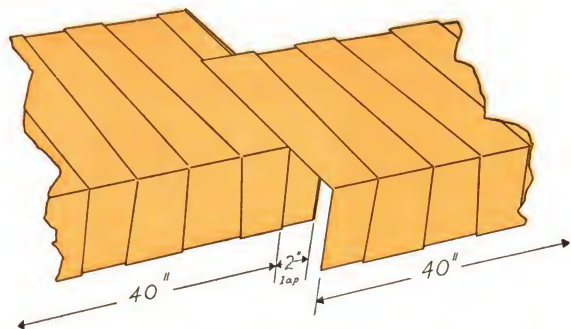
Thru-Wall Phantom View of Cheney Flashings Installed

SIZES Cheney Thru-wall Flashing comes in sheet form in widths from 6 to 60 in. (in even widths), and in the special forms illustrated at the right.

The standard overall length of the above sheets is 42 in. When laid up, they measure 40 in. In estimating the footage required, add 5% to net linear footage to allow for laps. Cheney Flashing is available in plain Copper or Lead Coated Copper.



Type No. 1—Standard Cheney Flashing



Two No. 3 Cheney Flashing Showing Lapping Feature—No Soldering Needed

FEATURES Fundamentally—CHENEY Flashing functions in a very definite manner:

1st. It forms a positive mechanical Keybond in every direction within the mortar bed—vertically as well as laterally.

2nd. It provides perfect drainage so that if moisture should penetrate a wall, it will drain quickly.

3rd. It provides adequately for expansion and contraction.

4th. It has a water-tight, interlocking lap that requires no soldering.

5th. It has a stiff counterflashing face that hugs the wall tightly after the base flashing has been installed.

All of these features were given careful study and intensive testing, and their positive functionings were THOROUGHLY PROVED before a single foot of Cheney Flashing was marketed.

FOR SPECIFICATION SEE PAGE 41 SPECIFICATIONS A B C AND D.



WHERE CHENEY FLASHING IS NEEDED

1. UNDER COPING STONES

Cheney Thru-wall flashing should be used under coping stones, as all stones are porous and the stones themselves expand and contract opening up cracks at the joints. Thru-wall flashing under the coping stones, therefore, not only bonds the stones to the wall without the use of dowels, but also prevents the moisture from getting through into the wall itself.

2. JUST ABOVE ROOF LINE

Thru-wall flashing should be used as a counter flashing just above the roof line to continue the roof to the outside faces of the building on all sides.

3. OVER TOPS OF CORNICES

Thru-wall flashing should be used over the tops of wide stone cornices; that is, cornices extending out from the wall 18 inches or more. On narrower cornices it should be used under the cornice. Flashing is necessary at this point because of the porosity of the stone and the fact that the stones expand and contract, opening up the vertical joints and allowing moisture to enter.

4. THROUGH PENTHOUSE AND RISING WALLS

Thru-wall flashing should always be used entirely through penthouse walls and all rising walls above roofs at a point just above the roof line.

5. OVER DOORS AND WINDOWS

Thru-wall flashing should be used over the heads of all windows and door openings to prevent the moisture that enters the wall from above from working down by gravity to the inside of the building.

6. UNDER WINDOW SILLS

Thru-wall flashing should be used under stone or brick window sills which are porous and which become saturated after continued rains.

7. OVER CONCRETE FOUNDATIONS

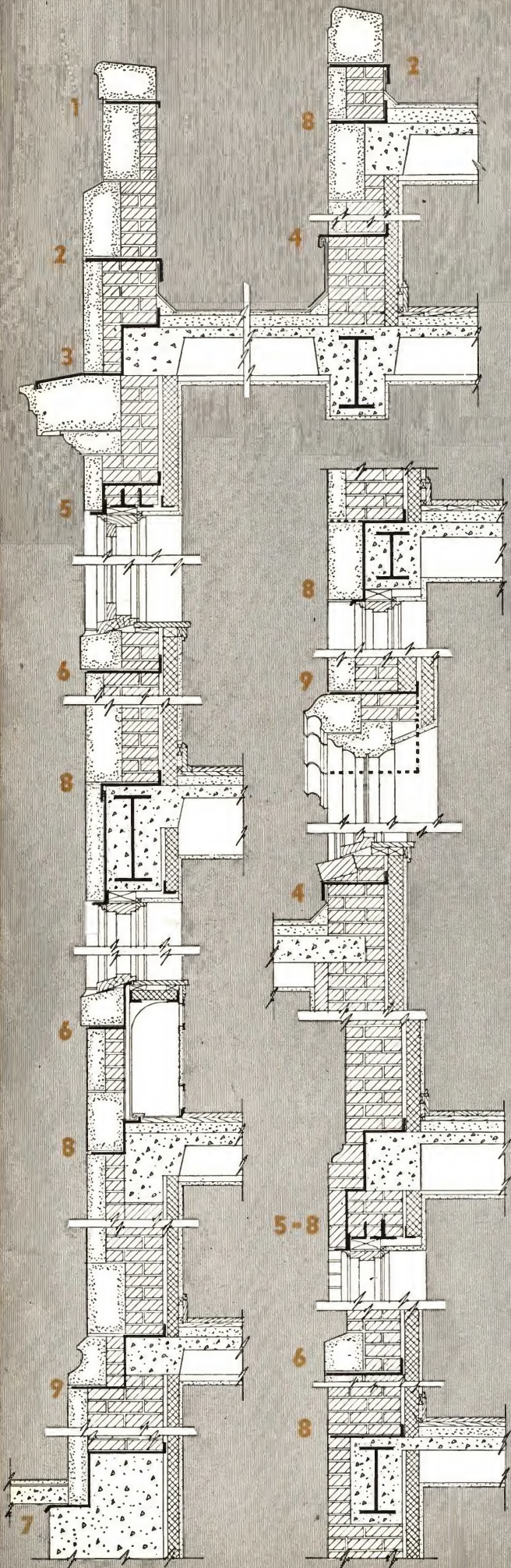
Thru-wall flashing should be used over concrete foundations where the first courses of stone or brick start upward, to prevent moisture from coming up into the walls from below by capillary attraction.

8. AT ALL SPANDREL BEAMS

Thru-wall flashing should be used at all spandrel beams to keep moisture away from the steel, to keep moisture from running in at the floor line, and to keep moisture away from the window heads below.

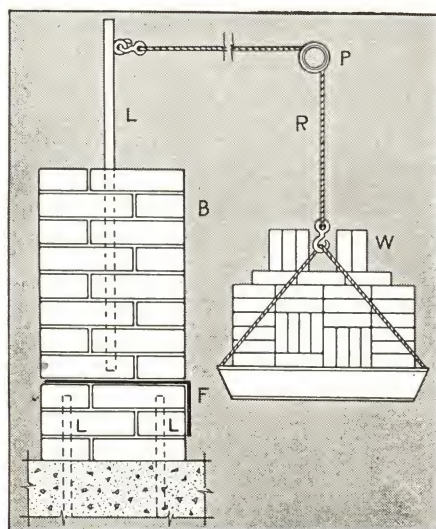
9. AT PROJECTING BELT COURSES

Thru-wall flashing should be used at all projecting belt courses where moisture tends to enter at the horizontal mortar joints as well as through the vertical joints of the stone itself.



TESTS OF CHENEY FLASHING

MASONRY BOND TEST



Resistance to Rupture is the real test for any wall flashing. Tests made by Prof. Frederick O. Anderegg prove conclusively that Cheney Flashing does make a positive mechanical bond.

Explanation of Test Diagram—B—12 x 36 x 42 in. panel. F—Cheney Flashing. L—Steel angle irons. P—Pulley. R—Rope. W—Weights.

Two tests were conducted, one with Cheney Flashing, one with plain copper. After panel had been exposed to weather for 28 days, weights were added until wall fractured. Test with Cheney Flashing showed wall had a Modulus of Rupture of 27 lbs. per sq. in. compared to 9 lbs. per sq. in. for copper having no vertical bond. Before wall could be pulled over, mortar in Cheney keys had to be sheared off, proving an effective mechanical anchorage.

The force required to pull the panel over was equivalent to a wind velocity of 264 miles per hour, the full pressure of which was directly against the wall. Calculated in the same way, the *Cheney Flashing would withstand a wind velocity of 1490 miles per hour* under a six inch coping stone.

These figures are conservative. Bear in mind this panel was only 42 inches long and lacking the stiffening of adjacent sections of the wall and of cross walls at the ends.

DRAINAGE TEST



The self-draining feature of Cheney Flashing is also particularly valuable, especially in cold weather when it is absolutely essential that water should drain from the walls quickly—before freezing. If permitted, alternate freezing and thawing soon break up the mortar joints, sometimes even the stonework itself, thus greatly weakening the wall.

Photo shows brick test panel of standard construction with Cheney Flashing installed and bottomless pan on top.

Water equivalent to cloud burst precipitation, about 24 inches per hour, was poured into pan. In 37 seconds the water flowed out of wall over flashing, from each lower key, the length of panel, proving that Cheney Flashing automatically provides its own weepholes.



Cheney Flashing Is Laid Quickly and Easily as the Masonry Progresses. The Ends of the Flashing Interlock to Form a Watertight Joint without Solder.



Cheney Flashing Installed on Cornice, Massachusetts Institute Technology. After Five Years' Exposure the Flashing Remains in Perfect Condition.



Laying Coping Stone, 86th Story, Empire State Building, N. Y. Note Absence of Dowels. Cheney Flashing Permits Such Installations on Parapets and Copings. It's the Safe

THREE-WAY FLASHING (10 oz.)

Three-Way Flashing (10 oz.) is identical in form to Cheney Flashing (16 ounce), the only difference being in the weight of Copper used.

RECOMMENDED USES Three-Way Flashing is recommended for the continuous flashing of spandrel beams for the flashing of window heads, window sills, belt courses and for all unexposed thru-wall flashing generally. However, for thru-wall flashing in parapets, for counter flashing, cornice and all exposed work we strongly recommend the use of Cheney Flashing (16 ounce).

Three-Way (10 ounce) Flashing when used to flash spandrel beams as detailed in section drawings below, is less expensive than the use of fabrics, plastics, wire mesh membranes, paper-thin copper sheets covered with asphalt bitumens or building papers.

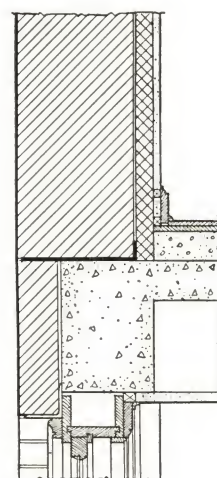
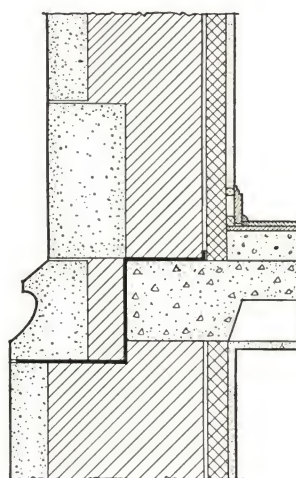
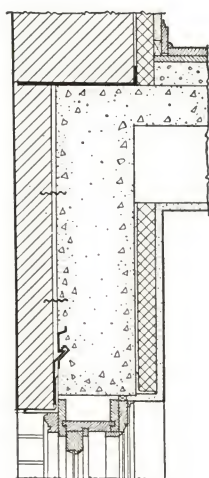
In fact its cost is so low that it may be used freely to provide maximum protection against leaks, seepage and the like throughout any masonry building. Of utmost importance is the fact that many of the above materials, due to their very nature, act as gaskets when set between two layers of masonry and thus retard the drainage of the seepage moisture. Three-Way (10 ounce) Flashing on the other hand, provides drainage with unique efficiency. This is done by the means of "Z" bends, the same feature that is largely responsible for its bond-

ing superiority and for its automatic compensation for expansion and contraction. Shrinkage of mortar forms a "weep hole" in every "Z" bend. No water is trapped to freeze and crumble mortar and masonry. Interlocking lap joints at the ends of each sheet form a continuous watertight flashing without soldering.

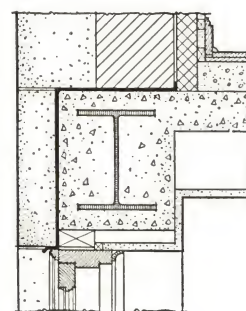
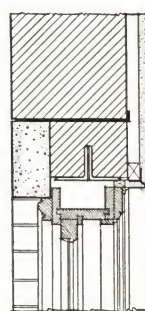
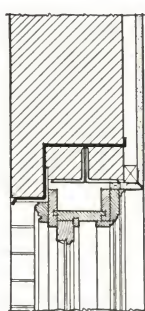
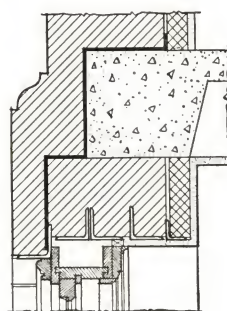
Three-Way (10 ounce) Flashing is more permanent because copper is not affected by mortar or any other masonry material.

STANDARD SIZES Three-Way Flashing as supplied in sheets form in widths from 6 to 36 inches. The standard length is 42 inches, of which 2 inches should be allowed for overlap. Available in plain Revere Copper or Revere Leadtex (lead coated copper) through Revere distributors.

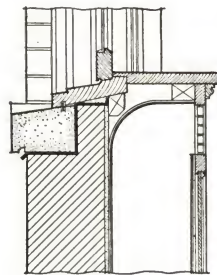
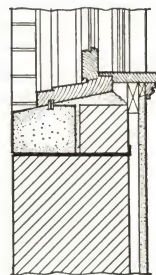
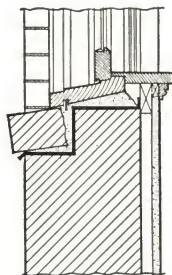
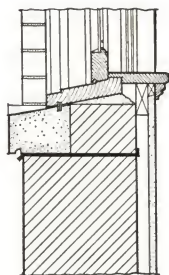
TYPICAL DETAILS



SPANDREL DETAILS



HEAD DETAILS



SILL DETAILS

DETAILS OF
THREE-WAY
FLASHING

FOR SPECIFICATIONS SEE PAGE 41 SPECIFICATIONS C AND D

CHENEY SPANDREL WATERPROOFING

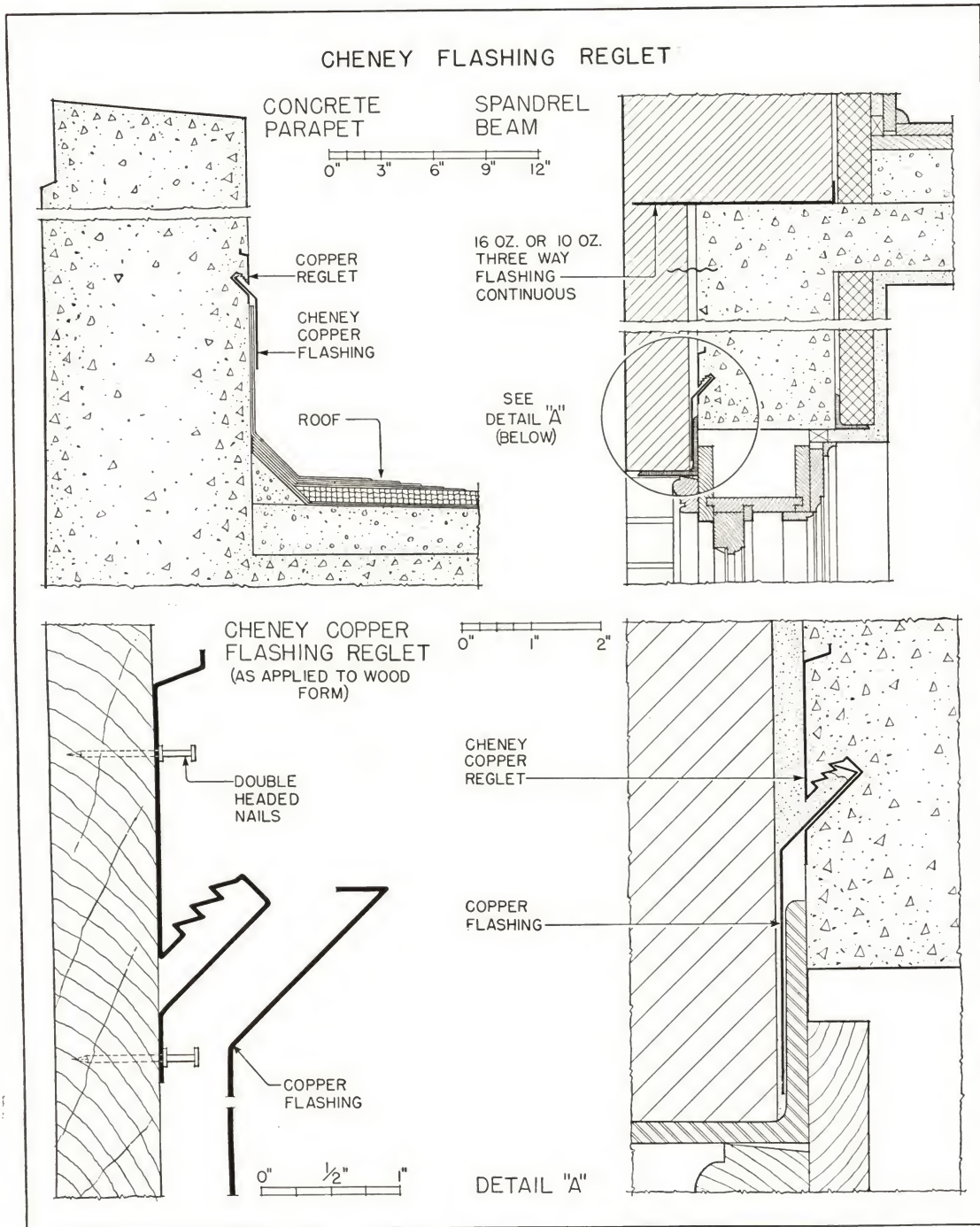
THE CHENEY SYSTEM Architects generally agree that Spandrel Waterproofing is necessary to modern construction. Many methods have been tried without complete success, among them being asphalt fabrics, felt membranes, wire mesh membranes, and paper-thin copper sheets covered with asphalt bitumen or building papers. Failure has been due to the disintegration of the materials themselves, the ease with which they puncture, and their inability to provide quick drainage of the moisture from the wall.

The Cheney system of Spandrel Waterproofing is based on an entirely new and different principle. As noted in the details below, Cheney Flashing (16 oz.) or Three-Way Flashing (10 oz.) is carried completely through the wall continuously around the entire building at the top of the spandrel beam as near as possible to the line of the finished floor. Cheney

Flashing Reglet of 16 oz. copper is nailed to the forms so that a 45 degree slot is formed at the bottom of the concrete beam just above the top of the lintel angle extending six inches beyond each end of the opening below. During construction, after the lintel angle is in place, a piece of plain copper flashing bent to detail is inserted full depth into Cheney Flashing Reglet, the upper surface of which is of saw-tooth design, thereby locking the flashing firmly into place.

ADVANTAGES

- (1) Simplicity of installation.
- (2) Copper is permanent and able to withstand abuse.
- (3) Provides weep hole drainage—a feature of Cheney Flashing.
- (4) And most important: usually costs one half of the usual membrane methods.



**DETAILS OF
CHENEY
SYSTEM
OF SPANDREL
WATER-
PROOFING**

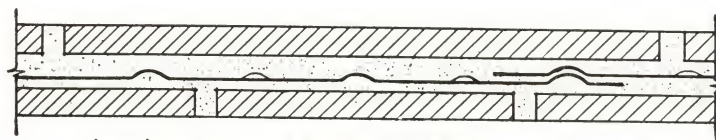
FOR SPECIFICATIONS SEE PAGE 42 SPECIFICATIONS F AND G



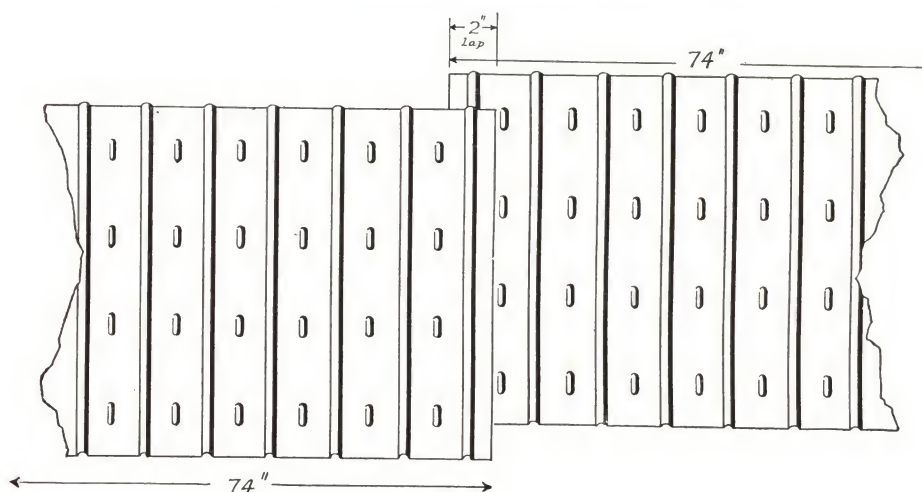
REVERE COPPER AND BRASS INCORPORATED

REVERE THRU-WALL FLASHING

Revere Copper Thru-Wall Flashing is a patented, low priced flashing which will positively prevent leaks, seepage and efflorescence in masonry walls. The pattern or design of this flashing prevents lateral movement of the wall. This pattern is rolled into the sheet, not stamped, which prevents thinning or hardening of the ridges and bumps and holds the original softness of the copper over the entire sheet.



Lengthwise Section of Flashing in Wall, Showing 2" Overlap



DESCRIPTION Revere Thru-Wall Flashing is designed so that water will weep out of the wall and lateral movement of the wall in all directions is prevented, due to the unusual mechanical bond between mortar and flashing. A water-tight interlocking joint is made between the flashing sheets without the use of solder to form a continuous flashing and to take care of expansion and contraction. This over-lap is 2 in., which meets Government specifications.

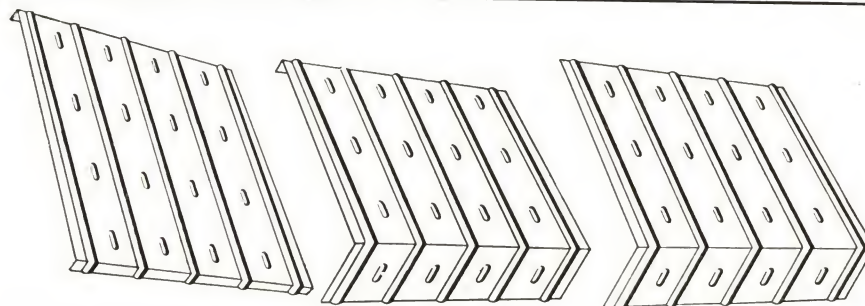
In the design of the flashing there are raised ribs $\frac{3}{16}$ in. high, spaced 3 in. apart. These are rolled into the sheet rather than stamped. The ribs run all the way across the flashing. This provides a distinct advantage because when the flashing sheet

is bent to form a 4-in. counterflashing face, it is much stiffer than plain copper which tends to be wavy when it has been bent up and down. There is also a series of embossings, $\frac{3}{16}$ in. high and approximately $\frac{1}{2}$ in. wide and 1 in. long, which prevents "in and out" movement.

SIZES Revere Thru-Wall Flashing is furnished in sheet form in even inch widths from 8 to 36 in. and overall length of 74 in., which when laid up with the lap measure 72 in.; these sizes will meet practically any need. It is available in 16 oz. Soft Copper or Revere Leadtex, lead coated copper. Revere Thru-Wall Flashing is stocked by Revere sheet metal distributors throughout the United States.

ONE TYPE COVERS ALL CONDITIONS

One of the principal advantages of Revere Flashing is its adaptability. All styles and sizes of Flashing can be cut, bent and formed from this sheet by the sheet metal contractor.



FOR SPECIFICATION SEE PAGE 41 SPECIFICATION E

THRU-WALL

CHENEY FLASHING (16 oz.)—GENERAL SPECIFICATION

- A** Thru-wall flashings shall be provided below parapet copings, for counterflashing in masonry parapets, where low roofs abut the superstructure, wherever flashing is set between two courses of masonry, and elsewhere as indicated on drawings. Thru-wall flashings shall be placed in the wall with mortar below and on top of flashing, so that a mechanical bond is obtained both vertically and horizontally. All counterflashing shall be bent to shape by the manufacturer. These flashings shall be CHENEY FLASHINGS (16 oz.) and shall be furnished and installed according to the standard specifications of THE CHENEY COMPANY, Architects Building, Philadelphia, Pa.

CHENEY FLASHING (16 oz.)—DESCRIPTIVE SPECIFICATION

- B** Thru-wall flashings shall be provided below parapet copings, for counterflashing in masonry parapets, where low roofs abut the superstructure, wherever flashing is set between two courses of masonry, and elsewhere as indicated on drawings. Thru-wall flashings shall be placed in the wall with mortar below and on top of flashing so that a mechanical bond is obtained. Flashings shall be formed into dovetailed shaped flat corrugations of undercut sawtooth ribs extending transversely of the sheet and not over 3 inches apart, which shall provide a mechanical keybond in the mortar bed in three directions (longitudinally, transversely, and vertically). Crimped copper or deformed sheets which provide bond only in horizontal direction will not be accepted. The use of attached members either riveted or soldered to the flashing sheets will not be permitted, and the metal shall not be drawn, broken, stretched or perforated in any manner. The flashing shall be set in a bed of mortar and shall be shoved into place in a manner that will insure filling all deformations of the copper. All counterflashing shall be bent to shape by the manufacturer.

CHENEY FLASHING (16 oz.)—FOR EXPOSED WORK THREE-WAY FLASHING (10 oz.)—FOR CONCEALED WORK } GENERAL SPECIFICATION

- C** Thru-wall flashings shall be provided below parapet copings, for counterflashing in masonry parapets, where low roofs abut the superstructure, wherever flashing is set between two courses of masonry, and elsewhere as indicated on drawings. Thru-wall flashings shall be placed in the wall with mortar below and on top of the flashing, so that a mechanical bond is obtained both vertically and horizontally. All counterflashings shall be bent to shape by the manufacturer. All counterflashing and flashing exposed to the weather shall be Cheney Flashing (16 oz.). All concealed flashing shall be Three-Way Flashing (10 oz.) and shall be furnished and installed according to the standard specification of THE CHENEY COMPANY, Architects Building, Philadelphia, Pa.

CHENEY FLASHING (16 oz.)—FOR EXPOSED WORK THREE-WAY FLASHING (10 oz.)—FOR CONCEALED WORK } GENERAL SPECIFICATION

- D** Thru-wall flashings shall be provided below parapet copings, for counterflashing in masonry parapets, where low roofs abut the superstructure, wherever flashing is set between two courses of masonry, and elsewhere as indicated on drawings. Thru flashings shall be placed in the wall with mortar below and on top of flashing so that a mechanical bond is obtained. Flashings shall be formed into dovetailed shaped flat corrugations or undercut sawtooth ribs extending transversely of the sheet and not over 3 inches apart, which shall provide a mechanical keybond in the mortar bed in three directions (longitudinally, transversely, and vertically). Crimped copper or deformed sheets which provide bond only in horizontal direction will not be accepted. The use of attached members either riveted or soldered to the flashing sheets will not be permitted, and the metal shall not be drawn, broken, stretched, or perforated in any manner. The flashing shall be set in a bed of mortar and shall be shoved into place in a manner that will insure filling all deformations of the copper. All counterflashing shall be bent to shape by the manufacturer. All counterflashing and flashing exposed to the weather shall be of 16 oz. copper. All concealed flashing shall be of 10 oz. copper.

REVERE FLASHING—GENERAL SPECIFICATION

- E** Thru-wall flashing shall be provided below the parapet coping, for counterflashing in masonry parapets and where low roofs abut the superstructure and elsewhere as indicated on drawings. That portion in the wall shall be bonded horizontally at intervals of not more than 3 in. by a series of ribs and raised projections $\frac{3}{16}$ in. high, with ribs extending the full width of the wall. End joints shall be interlocking and overlapping at least 2 in. so that a watertight joint is made without soldering. The flashing shall be Revere Thru-Wall Flashing (Revere Copper and Brass Incorporated) and shall be formed so as not to cause any accumulation of water on the horizontal surfaces and the transverse bonding ribs shall not be drawn or stretched.



SPANDREL WATERPROOFING

F

MASONRY. All exterior door or window openings in all concrete spandrel beams are to be provided with CHENEY FLASHING REGLETS by the sheet metal contractor. This contractor shall notify sheet metal contractor and cooperate with him so that he may place flashing REGLETS in the concrete forms of spandrel beams before forms are placed in position.

Refer to sheet metal specifications for description of this FLASHING REGLET.

Take precaution in the placing of concrete so that FLASHING REGLET does not become damaged in any manner.

SHEET METAL. Furnish and install over all door and window openings and all concrete spandrels at a point not more than 1 inch above top of vertical leg of angle Cheney Flashing Reglet. The contractor shall attach Cheney Flashing Reglets to the concrete forms of spandrel beams at the time these are erected by others and shall cooperate with contractor for this work, installing REGLETS before forms are put into place. REGLETS shall be attached to inside of wood forms with $\frac{3}{4}$ inch special copper double head nails (furnished with REGLETS). REGLETS shall extend 6 inches beyond each end of opening and shall be made of 16 ounce copper. Forty-five degree slot in reglet to be $1\frac{1}{8}$ inches deep and with $\frac{1}{4}$ inch opening and the upper surface of slot to be of sawtooth design to provide self-locking means when copper counter-flashing is inserted.

Furnish and install at all floor levels continuously around entire building a 16 ounce (or 10 ounce) thru-wall flashing. Flashings shall be formed into dovetail shaped flat corrugations or undercut sawtooth ribs, extending transversely of the sheet and not over 3 inches apart, which shall provide a mechanical keybond in the mortar bed in three directions, (longitudinally, transversely, and vertically). Crimped copper or deformed sheets which provide bond only in horizontal directions will not be accepted. The use of attached members, either riveted or soldered to the flashing sheets, will not be permitted, and the metal shall not be broken, drawn, stretched or perforated in any manner. The flashing shall be set in a bed of mortar and shall be shoved into place in a manner that will insure filling all deformations of the copper. Flashing shall turn up against columns not less than 2 inches and be made watertight with plastic cement.

Flashing Reglet and Thru-Wall flashing shall be as manufactured by the Cheney Company, Architects Building, Philadelphia, Pa.

Furnish and lock into flashing reglet as specified in concrete specification a 16 ounce copper counter-flashing lapping over vertical leg of angle not less than 2 inches. Counterflashing shall be formed with $\frac{3}{8}$ inch lip that self-locks into the flashing reglet and extends 4 inches beyond each end of all exterior door and window openings.

CONCRETE PARAPET

G

MASONRY. Install at all concrete parapets and other concrete walls rising above all roof surfaces at a point not less than 8 inches above finished roof a copper self-locking flashing reglet (furnished by sheet metal contractor). Reglet shall be attached to inside of wood form with $\frac{3}{4}$ inch double head smooth wire nails. Reglet shall be made of 16 ounce copper with 45 degree slot in reglet to be $1\frac{1}{8}$ inches deep and with $\frac{1}{4}$ inch opening and the upper surface of slot to be of sawtooth design to provide self-locking means when copper counterflashing is inserted.

SHEET METAL. Furnish to concrete contractor for him to install in all concrete parapets and other concrete walls rising above all roofs a copper self-locking flashing reglet. Reglet shall be made of 16 ounce copper with a 45 degree slot in reglet to be $1\frac{1}{8}$ inches deep and with $\frac{1}{4}$ inch opening and the upper surface of slot to be of sawtooth design to provide self-locking means when copper counterflashing is inserted.

Flashing reglet shall be as manufactured by the Cheney Company, Architects Building, Philadelphia, Pa.

Furnish and lock into flashing reglet as specified in concrete specification a 16 ounce copper counter-flashing lapping over the base flashing not less than 4 inches. Counterflashing shall be formed with $\frac{3}{8}$ -inch lip that self-locks into the flashing reglet and ends of counterflashing shall overlap not less than 2 inches.

TERMITE PROTECTION

It is estimated that termites destroy some \$50,000,000 worth of property annually in the United States. Although there are almost 2000 different species of these insects, approximately 95% of this damage is caused by one type called Subterranean Termites. Their habits are well known and it has been established that they require moisture in order to live. It has also been discovered that termites cannot build shelter tubes around the face edge of a metal sheet which projects outside of the adjacent construction. It is upon these facts, that the method of termite protection with copper shields has been developed.

THE PRINCIPLE OF SHIELDING Termite protection with Copper Shields is accomplished by providing a continuous copper barrier between the foundation and the wooden portion of a building. The function of the shield is to prevent the termites from entering the building to destroy the wood which acts as their food supply. The shield also serves to break the contact between termites already in the building and the ground moisture necessary for their continued existence. Copper, with its ease of forming and its rustproof and corrosion resistant qualities, is the accepted material for shields that will give lasting protection.

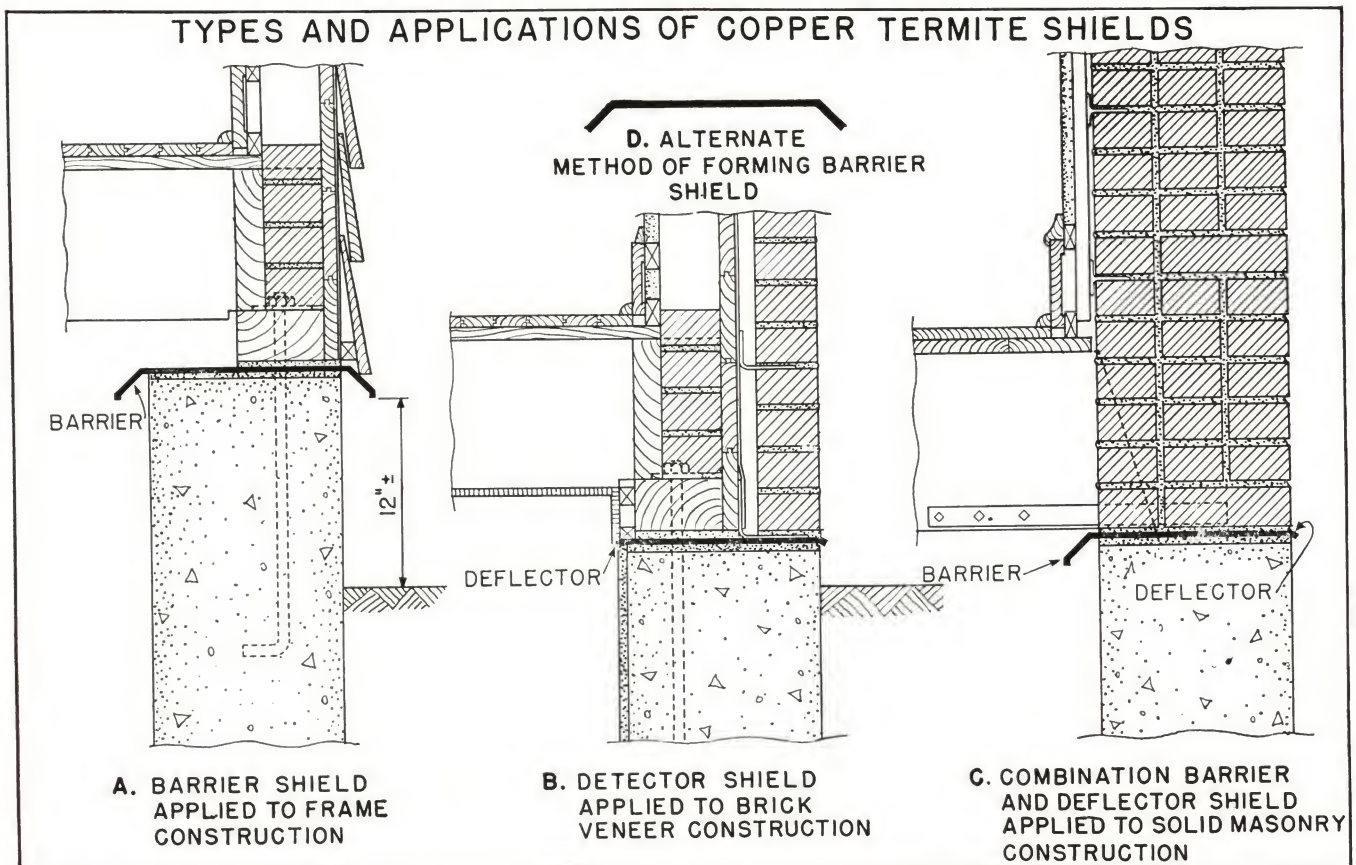
BARRIER TYPE SHIELDS The most effective design for preventing the passage of termites is the Barrier Type which is

illustrated below. The type shown at A, with the vertical turn-down edge, is preferable, but the type shown in detail D is also satisfactory and under certain conditions is easier to use. These shields formed from Revere Sheet Copper provide a lasting and impenetrable metal barrier. The sharp edge of the metal, either vertical or at 45° provides a 180° angle around which the termites are unable to construct a shelter tube.

DEFLECTOR TYPE SHIELDS The Deflector Type of Shield, illustrated at B, does not provide an impassable Barrier to the termite. It is used at points which are easily available to inspection, as at the interior wall of a basement recreation room, or on the outside where a brick porch abuts a wall.

In order to build a shelter tube from the ground moisture to the woodwork of a house, the termites will be forced out around the shield at the "point of detection." Then if the tubes are broken off the termites will die for want of moisture. This type of shield, plus inspection once or twice a year, gives satisfactory protection.

MATERIALS Revere 20 ounce Cold Rolled sheet copper is recommended for termite shields but 16 ounce Cold Rolled can be used satisfactorily. The forming can be readily done by the sheet metal contractor.



DIVISION OFFICES AND MILLS

BALTIMORE DIVISION
1301 Wicomico Street
Baltimore, Md.

DALLAS DIVISION
2200 No. Natchez Avenue
Chicago, Ill.

ROME DIVISION
Rome, New York

MICHIGAN DIVISION
5851 West Jefferson Avenue
Detroit, Mich.

TAUNTON-NEW BEDFORD DIVISION
24 North Front Street
New Bedford, Mass.

ROME MANUFACTURING COMPANY DIVISION
Rome, New York

DISTRICT SALES OFFICES

New York, N. Y.
New York Central Bldg.
75 East 45th Street

Providence, R. I.
1215 Industrial Trust Bldg.
111 Westminster Street

Pittsburgh, Pa.
727 Gulf Bldg.

Philadelphia, Pa.
1201 Architects Bldg.
17th and Sansom Streets

Milwaukee, Wis.
626 E. Wisconsin Avenue

Atlanta, Ga.
911 Rhodes-Haverty Bldg.

Cleveland, Ohio
1110 Midland Bldg.

Cincinnati, Ohio
2616 Carew Tower

Grand Rapids, Mich.
922 Grand Rapids National Bank Bldg.

New Orleans, La.
425 Decatur Street

Los Angeles, Calif.
124 W. Fourth Street

San Francisco, Calif.
562 Russ Bldg.

Houston, Texas
Second National Bank Bldg.

Boston, Mass.
United Shoe Machinery Bldg.
140 Federal Street

Hartford, Conn.
209 Capitol National Bank Bldg.
410 Asylum Street

Minneapolis, Minn.
724 Metropolitan Bank Bldg.

St. Louis, Mo.
955 Telephone Bldg.
1010 Pine Street

Dallas, Texas
1314 Tower Petroleum Bldg.

Seattle, Wash.
317 Pioneer Bldg.

Revere Copper *and* Brass

FOUNDED BY
PAUL REVERE



INCORPORATED

Executive Offices: 230 PARK AVENUE, NEW YORK CITY